

NOTES

ON THE

Medical Topography of Calcutta,

BY

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It is necessary for a Physician when entering a City of which he knows nothing, to examine its exposure, the predominant winds, the seasons, the nature and elevation of the soil, the quality of the waters of which the inhabitants make use, and the kind of life they follow.—HIPPOCRATES.

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ADVERTISEMENT.

IN submitting to the Medical Board, a few detached Notes having reference to the Medical Topography of Calcutta and its Suburbs, I greatly regret that even these must, on account of my varied and incessant occupations, prove more brief and imperfect than I could have wished, or the subject deserves. I hope, however, to see the matter undertaken by some person possessing more ability and more time than I can bring to it; for, whether we consider the History of this immense city—its geographical position—its rapid rise—its great and various population—its importance as a place of commerce, and as the seat of Supreme Government; it cannot but be viewed with great interest by the Medical Topographer.

Calcutta ; May 12th, 1836.

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HISTORICAL

NOTICES OF CALCUTTA.

IT has been observed that of all the European nations, who have planted distant settlements the English have invariably shewn least regard to the proper selection of localities for the sites of their colonial cities ; and this, I think, must in general be ascribed to the commercial spirit taking the lead : a good harbour and soundings, or else the embouchures of great rivers were the first objects of desire ; and it generally happened that both led to the positions the most unfavorable to health.

The English careless in selecting healthy sites for their colonied cities: the reason.

This has been almost universally the case in our West Indian colonies ; but here, we have not even the consolation of a commercial expediency in favour of the choice of site for our metropolis ; for, I believe, there are many places between us and the sea, better suited for shipping, while there exist none so ineligible as to their immediate and surrounding localities. Captain Alexander Hamilton, who visited various parts of India between the years 1688 and 1733, says, that “ a more unhealthful place could not be chosen on all the river.”

Illustrated in the West Indies.

The same in Bengal.

Capt. Hamilton's objections to the site of Calcutta.

Foundation
of Calcutta
by Mr. Job
Charnock.

The site of Calcutta was chosen about the year 1689-90, through accident! : it possessed a “large *shady* tree,” under which its founder, Mr. Job Charnock, could enjoy his repose and his hookah ; and therefore it was that he chose it for his “emporium.” Having determined to quit the Factory at Hooghly, he first tried to establish himself at Oolabariah, on the western bank of the river, but the village of Sootanutty with its various attractions, and large shady tree, carried the palm.

The name
Calcutta de-
rived from the
temple of Ka-
lee.

“The villages of Chuttanutty, Govindpore, and Calicotta, which, in virtue of the Prince’s Nishán, had been purchased from the Zemindars with their districts, extended about three miles on the eastern side of the Bhaggarutty river, and about one mile inland. The latter of these villages takes its name from a temple dedicated to Kālee, the Hindoo goddess of time ; and from it the English called their town Calcutta.”—*Stewart’s History of Bengal*.

In the East Indian Chronologist, published here by Mr. Hickey in 1801, I find the following mention of the founder of Calcutta ; and, notwithstanding the faults of his character, it is not right that he should be altogether forgotten :

Historical
notices.

“When peace was established between the great Emperor Aurungzebe and the English, Job Charnock, the Company’s Chief at Hooghly, twice removed the Factory, and in the year 1689-90 finally formed an English settlement at Calcutta, which, ere one century terminated,

became a mighty city, the magazine of trade, the arbitress of kingdoms and the seat of empire.”

“ Mr. Charnock chose the ground where infant Calcutta stood, for the sake of a large shady tree which was contiguous : the situation then and for many years afterwards proved very unhealthy ; but by the exertions of able engineers, and the industry of individuals since the victory of Plassy, the surrounding woods have been cleared, and health has fixed her residence in that great and grand emporium.”

Mr. Job Charnock's reason for choosing his site.

“ Tribunis, (I believe Colonel Ironside) in the first volume of the Asiatic Miscellany, terms Mr. Charnock, the illustrious Charnock, the first conspicuous Englishman in this side of the world. Mr. Orme says (Book the VI.) Mr. Charnock was a man of courage, without military experience, but impatient to take revenge on a Government, from which he had personally received the most ignominious treatment, having been imprisoned and scourged by the Nabob. The sense of such an indignity was doubtlessly deeply rooted in the mind of Mr. Charnock, and perhaps was one of the reasons for that severe usage of the natives, ascribed to him by Captain Hamilton, who says, the Governor at the hour of dinner and near his dining room, had delinquents punished that he might satiate himself with their cries.”

Biographical notices of Mr. Job Charnock.

“ From an oral tradition still prevalent among the natives at Barrackpore (now an established military cantonment fourteen miles distant

Mr. Charnock built a bungalow at Barrackpore.

from Calcutta) we learn that Mr. Charnock built a bungalow there, and a flourishing bazar arose under his patronage before the settlement at Calcutta had been determined on."

Barrackpore known to the natives by the name of Chanock.

"Barrackpore is at this day best known to the natives by the old name Chanock, and Captain Hamilton, misled by their method of pronounciation, invariably writes the name without the letter *r*."

Death of Charnock,

"Governor Job Charnock died on the 10th of January 1692, and if the dead knew anything of the living and could behold with mortal feelings this sublunary world, with what sensations would the Father of Calcutta glow to look down this day upon his city. Charnock ! may your name and your city be immortal, and may Calcutta, the sister of England, last till time itself expires !"

Purchase of the Zumeendary right to Govindpore, Sootanuttty and Calcutta.

In 1698, the grandson of the Emperor Aurungzebe having visited Bengal, permission was obtained to purchase the Zumeendary rights to the villages of Govindpore, Sootanuttty and Calcutta, to the extent of a mile and a half square, at an annual revenue of £130 ; this was begun, "cautiously so as not to alarm the native Government," the construction of old Fort William.

Possession of 38 villages confirmed to the English through the disinterested conduct of Mr. William Hamilton, Surgeon.

In 1717, the possession of thirty-eight villages was confirmed to the English at the solicitation of Mr. William Hamilton, Surgeon to the Embassy to Delhi.

“ Ferrokhsere had been some time engaged to marry the daughter of Raja Ajeet Sing, one of the Rajepoot Princes; and the bride had arrived, for that purpose, at the capital: but the Emperor, being afflicted with a complaint which all the skill of his own physicians could not cure, was under the necessity of postponing the marriage. At length, in consequence of the recommendation of Khan Dowran, he permitted Mr. Hamilton, the Surgeon of the Embassy, to attend him; and that gentleman having, by a judicious operation, restored the Emperor to health, became very deservedly a great favorite with his majesty, who, in addition to many proofs of the royal munificence, promised to grant any other favour he should ask. Mr. Hamilton, instead of requesting any further reward for himself, besought his majesty to concede to the English Ambassadors the object of their mission. The Emperor surprised at Mr. Hamilton's disinterestedness, promised that as soon as the marriage ceremonies were over, he would take the petition into his serious consideration, and grant the English every indulgence he could, consistent with the dignity of his own empire.”

In clearing away the ground for the foundation of the new Church in Calcutta, about thirty years ago, the tombstone of Mr. Hamilton was discovered; which, in addition to an English epitaph bore a Persian inscription, thus translated by Mr. Gladwin; “ William Hamilton, Physician in the Service of the English Company, who had accompanied the English Ambassador to the enlightened presence, and

having made his own name famous in the four quarters of the earth by the cure of the Emperor, the Asylum of the World, Mohammed Ferrukh-seer the Victorious; and, with a thousand difficulties, having obtained permission from the Court, which is the refuge of the universe, to return to his country; by the Divine decree, on the fourth of December 1717, died in Calcutta, and is buried here.”—*Stewart's History*.

“For the honor of the faculty,” says Mr. Hickey, “be it remembered, that this is the second time the Hon’ble Company were eminently served by that learned body. The memory of Boughton and of Hamilton ought to be a standing toast at the polite tables of Calcutta.”

But little known relating to Calcutta for many years after Mr. Charnock's death.

For many years from the time of Job Charnock's death, little is known of the progress made in his emporium; indeed in 1717 it remained but a straggling village of mat houses, the whole of the ground south of Chandpaul Ghaut being thickly covered with jungle and forest trees: near Tolly's Nullah there were two villages, the inhabitants of which were induced to settle in Calcutta by the ancient family of Sèt, at that time the wealthiest merchants residing here. The present site of Chowringhee was occupied by villages of the most miserable kind, surrounded with marsh and jungle; and although Calcutta may be said to have extended to Chitpore Bridge, yet the intervening space was in no better condition than the rest; all was jungle and marsh.

Former state of Chowringhee.

Commerce seems, however, to have grown up very early. Early commercial prosperity.

“Success,” says Stewart, “produced new adventurers; and besides a number of English private merchants licensed by the Company, Calcutta was, in a short time, peopled by Portuguese, Armenian, Moghul, and Hindoo merchants, who carried on their commerce under the protection of the English flag: thus the shipping belonging to the port, in the course of ten years after the Embassy, amounted to ten thousand tons; and many individuals amassed fortunes, without injury to the Company’s trade or incurring the displeasure of the Moghul Government.”

Captain Hamilton speaks in great praise of the kindness and hospitality towards strangers shewn by the residents of his day: he adds however, that, “in Calcutta all religions are freely tolerated but the Presbyterian, and that they brow-beat.” An old Annalist refers to 1737, as a period when we had “opulent merchants, in days when gold was plenty, labour cheap, and not one indigent European in all Calcutta; but the same year brought with it a great calamity, and from the extent of loss reported, the Factory must even then, have been one of growing commercial importance.

“In the night between the 11th and 12th of October 1737, there happened a furious hurricane at the mouth of the Ganges, which reached Terrible inundation of 1737.

sixty leagues up the river. There was at the same time a violent earthquake, which threw down a great many houses along the river side in Golgoto (*i. e.* Calcutta) alone, a port belonging to the English, two hundred houses were thrown down, and the high and magnificent steeple of the English Church sunk into the ground without breaking. It is computed that 20,000 ships, barks, sloops, boats, canoes, &c. have been cast away: of nine English ships, then in the Ganges, eight were lost and most of the crews drowned. Barks of sixty tons were blown two leagues up into land over the tops of high trees; of four Dutch ships in the river, three were lost with their men and cargoes: 300,000 souls are said to have perished. The water rose forty feet higher than usual in the Ganges."—*Gentleman's Magazine for 1738-9.*

Construction
of the Maha-
ratta ditch in
1742.

In 1742 was began the ditch around Calcutta, intended at the time as a defence against the incursions of the Maharattas. It never completely invested the town, but, in so far as it went, it may have had the effect of draining the grounds to the north and east, though for purposes of defence, it could not have proved of much use.

Modern Cal-
cutta dates
from 1756.

We may in reality then, date the origin of Calcutta from the year 1756, when the reconstruction of the city commenced, after its capture and destruction by Suraj-ud-Doulah; at which period, according to Orme, there were but seventy houses belonging to the English. What are now called the Esplanade, the sites of

TERRITORY OF CALCUTTA MDCCLVII.

- A. *Perrinys Point.*
 - B. *Govindrametres Garden.*
 - C. *Omichunds Garden.*
 - D. *Governapore.*
- ▲▲▲
▲▲▲
▲▲▲

*Tents and Huts of the Nabob's
Army.*



The first part of the report is devoted to a general
 description of the country, its climate, soil, and
 natural resources. It is followed by a detailed
 account of the various industries and occupations
 pursued by the inhabitants. The report then
 proceeds to a description of the public
 buildings, and the state of the roads and
 navigation. It concludes with a summary of
 the principal facts and observations which
 have been made during the course of the
 mission.

1870
 1871

Fort William and Chowringhee, were so late as the above year, a complete jungle, interspersed with huts, and small pieces of grazing and arable land. The old Fort and Clive Street, then and for many years afterwards, comprehended the whole of Calcutta, Clive Street being the place of all business.

Nowhere has the activity and enterprise of British commerce been better displayed than in the rapid rise of this capital; for, even within the memory of persons still living, the houses of Europeans were few in number, and of mean appearance. Previously to 1756, Calcutta was, in short, but a trading factory—a valuable one to be sure, but yet affording little promise of its future greatness. It has often happened that the value of an acquisition has only become known by its loss; and it may have been here, as elsewhere, that necessity has proved our best friend, and, without our knowledge, turned out the best promoter of public health. Soon after the re-occupation of Calcutta by the British, an extraordinary impulse seems to have been given to the spirit of improvement, so that within forty years, and notwithstanding all the disadvantages of position, it became a city numbering five hundred thousand individuals—a degree of prosperity unparalleled, perhaps, in any other quarter of the world, and which had increased to such a degree, that in 1796, some commercial houses were supposed to have had dealings to the amount of two crores of Rupees annually. Soon after the battle of Plassey, 1757, Fort William was commenced by order of Lord Clive;

Its rapid
rise and
prosperity.

The New
Fort begun by
order of Lord
Clive.

and I know of no other work performed at the instance of Government, of the same value to public health, through the opening out and clearing of so large a piece of ground. It has justly been said that the Esplanade of Fort William forms the *lungs of Calcutta*, and certain am I that we should breathe but thickly without them.

Severe famine of 1770, and consequent sufferings.

The year 1770 was memorable for a grievous famine and pestilence which afflicted Bengal generally, and carried off, according to Mr. Hickey, 76,000 souls in the streets of Calcutta, between the 15th July and 10th September. In addition to that calamity, several great granaries were destroyed by terrible fires which occurred in May and June. "There was not a corner in the city or any lurking-place in the vicinity of Calcutta where the living, the dying and the dead, were not mingled or heaped together in melancholy confusion. It was impossible to stir abroad on business or recreation, where these offensive and mortifying associations were not in the way. The daily employment of hundreds was to remove the dead in proportion as they became a nuisance to the living. These in cart-loads, and without any funeral or religious obsequies, were promiscuously plunged into the river. By this increasing and prodigious mortality, notwithstanding the most constant attentions to decency and cleanliness, the town and suburbs were so much infested, that from the raging heat of the weather, the foul congregation of vapours which incessantly ascended from the unburied dead,

and the torrid or intemperate state of the atmosphere, a pestilential influenza was generally and seriously apprehended. Fortunately an extraordinary flock of carnivorous birds, animals and vermin, were allured from their fastnesses and their solitudes by the putrefaction of the scene. The water of the Ganges became loathsome and corrupt from the loads of dead bodies which it daily received. Pork, geese, ducks and every species of provisions, fattened by substances thus gross and abhorrent, were avoided as poisonous. The fish in the river were noxious, and even sometimes fatal to those who eat them. Mutton, which could hardly be obtained at any price, became the only food which could be enjoyed with safety or satisfaction."—*Transactions in Bengal.*

In Hickey's Gazette for 1781, I find notice of a proposal submitted to the "Board" (meaning I suppose the Council Board) by a Colonel Campbell, for cleaning and draining the town, on an estimate of two lacks of rupees per annum; but it would seem that the Board, "for certain reasons best known to the parties themselves," declined the Colonel's plan and actually imposed or intended to impose, a "stupendous tax" of from 7 to 14 per cent. on landed property for the same objects; whether this latter measure was found impracticable in itself, or whether it gave way to measures of external political importance, I cannot say, as there is no further notice regarding it. In 1784, a Mr. Henckell effected a clearing of considerable portions of Sunderbund land near the town,

Plan for improving Calcutta submitted to Government by Colonel Campbell, in 1781.

Progressive clearing of Sunderbund land around Calcutta.

which greatly contributed to diminish the local sources of fever.

Construction
of Circular
Road by order
of Lord Wel-
lesley.

One of the first acts of the Marquess Wellesley was, in 1799, to enlarge and extend the roads around Calcutta especially the Circular Road, a great improvement; but to effect which the famous "Bythna Kanna" tree was cut down: it had been the place of assemblage for native merchants from the earliest period, and its fall was looked upon with superstitious regret.

The greatest
of the modern
improvements
executed
thro' the Lot-
tery Com-
mittee.

Calcutta of the present century owes the greater part of its improvements, certainly those affecting health, to the well directed labours of the Lottery Committee. I believe it was at the instigation of this intelligent public body, that the river-bank has been cleared for the construction of the present ghauts, and the magnificent Strand road, the two greatest improvements within my personal recollection. I believe also, that all the new squares and fine open roads leading to and from them in various directions, owe their construction to the same authority. There can be no doubt of the beneficial effects of these measures in repressing the causes of fever, by draining, cleaning and promoting freedom of ventilation and cleanliness. But so long as we are without a complete system of draining, all else is but palliative; for if it amounts to a demonstration, as stated by a distinguished author, that "freedom from some of the most fatal scourges of the human race, and a gradual amelioration of health" can be traced to the "free exposure of the streets of

All improve-
ments of but
partial bene-
fit, so long as
we are with-
out an effec-
tive plan of
draining.

London to the sun and wind, a hard regular pavement preserved clean by proper scavengers ; the construction of common sewers and privies, and the advantage of a flowing stream," what amelioration of the public health may not be expected from similar measures in such a city as this, situated as it is within the tropics ?

Dr. Caius, the most eminent physician in England at that period, states that the mortality of London from ague in 1588 was such that the living could hardly bury the dead : now, such is the effect of local improvement on health, that ague is *almost unknown* in modern London. Even in this city, such had also been the result of all the progressive improvements above noted, that Dr. Lind comparing the state of health in his time to what it had once been, says, " Calcutta, built literally on a swamp, on the east side of the Hooghly, and surrounded to this moment by immense lakes at a few miles distance, has by the draining of that part of the city inhabited by Europeans, become as healthy as any country of the same latitude on earth.*

Former state of London as compared to its present healthiness.

Dr. Lind's notices of the former and present state of Calcutta.

" Ten miles below the city where the country is not cleared, and the rapidity and rankness of vegetation is suffered to infect the air, the jungle or violent bilious fever is sure to attack any one who comes for a time within its atmosphere : yet the old village of Fultah, while the Dutch had an establishment there, was healthy,

* I fear the Doctor here has gone a little too far, and that we have not as yet reached that point of excellence.

because the ground was cleared ; since they left it, it has become more unhealthy.”

Malte-Brun
on climate.

Malte-Brun, when speaking of the most temperate climates, declares “ that it is man himself who has in a great measure created these salubrious climates. France, Germany and England, not more than twenty ages ago, resembled Canada and Chinese Tartary, countries situated, as well as our Europe, at a mean distance between the equator and the pole.”

Capt. Hamilton
on Calcutta in
his time.

On the insalubrity of Calcutta in the earlier period of its occupancy by Europeans, we have again the evidence of Captain Hamilton. “ One year I was there, and there were reckoned in August about twelve hundred English, some Military, some servants of the Company, some private merchants residing in the town, and some seamen belonging to the shipping lying at the town, and before the beginning of January, there were four hundred and sixty burials registered in the Clerk’s book of mortality.”

This, worse than Batavian condition, and frightful sacrifice of life, are ascribed by the same authority to the annual subsiding of the Salt-Water Lake, leaving its marshy banks covered with fish and exposed to a vertical sun. No doubt this had a most injurious effect, but the unimproved state of the ground in and about the town itself, consequent on the unsettled state of our possessions previously to the grant of 1765 ; the marsh and rank vegetation, producing constant and unwholesome exhalations, retained

and accumulated in a humid atmosphere—these too had their full share.

In more recent times, it was the custom of the European inhabitants of Calcutta to meet on the 15th of November of each year, to congratulate each other on their escape from the period so emphatically marked by Captain Hamilton ; but though this is no longer considered necessary on account of the insalubrity of the place, still I think it will not be difficult to shew that we are far indeed from having effected for our “emporium” all that might or ought to be done for it. For many years to come, little more can be done or expected from that commercial or private enterprize to which Calcutta has hitherto owed so much. From the natives we cannot expect any great aid, *until they are shewn the usefulness of public work*, when, I am confident, they will readily comprehend how clearing and proper draining will certainly make the value of landed property in certain quarters, incalculably greater than it is now, by rendering what is at present useless, fit for building and similar purposes ; so that what *we* know to be most conducive to *health*, *they* may at the same time be led to perceive as greatly conducive to their pecuniary interests.

Europeans
used to meet on
15th Novem-
ber to congra-
tulate each
other on being
alive.

“It is only by constant efforts of industry that the salubrity of any spot is maintained ; when these are relaxed, or when prosperity and civilization decline, the seeds of diseases are immediately deposited in the earth.”*

* Hawkins' Statistics.

Again, if we accord with Sir Gilbert Blane's opinion, that all predominant diseases are referable to the following general heads, viz.—1st, Vitiated exhalations and secretions of the human body;—2d, Noxious exhalations of the earth; and, 3rdly, Depraved habits of life; we shall at once see how much of public health, in the great matter of *prevention* of disease, may be effected through a practical application of the science of Medical Topography.

The injury from human exhalation is removed simply, by prevention of crowding, by exposure of the streets and houses to the sun and wind, cleanliness, &c.; and that from terrestrial exhalation, by draining, clearing, levelling and paving, &c.

Conclusion
to be drawn
from this
sketch.

The brief Topographic History of Calcutta here attempted, proves what may be done by a well applied capital to render one of the worst known localities habitable; it also proves, that a further application of the same means might even render it healthy.

C A L C U T T A.

Viewing modern Calcutta as depicted on a Military Map, which, as exhibiting the most perfect and detailed topography, should always be preferred, it may be described as occupying a space along the left bank of the Hooghly of four miles and a half estimated from Chitpore to Kidderpore, north and south, and of one mile and a half from west to east ; that is, from the river-bank to the Circular Road. To the north, it is bounded by the outer suburb of Chitpore, and to the east and south-east by those of Nundenbagh, Behar-Simlah, Sealdah, Entally, and Ballygunge ; beyond which are the two canals and the Salt-water Lake. South of the town and fort are the great suburbs of Bhowaneepore, Allipore and Kidderpore.

Topographic
Sketch.

More remotely, Calcutta has to the south and east, extending for 180 miles along the sea, the woody tract of the Sunderbunds, consisting of jungle and marsh, including the embouchures of the Ganges : to the north and west, is the tract of annual inundation, anciently called Beng :—"the work of the Ganges,"—deeply covered over during the rains, and intersected by innumerable rivers. Like Guiana, the delta of the Ganges is below the general level of the sea at high water mark ; and like the same country, it would be uninhabitable from continued stagnation, but for the fluctuating declivity occasioned by the retiring tides.

The reason why the delta of the Nile is not infested with remittent and intermittent fevers is, that the fall towards the sea is so great as to admit of no stagnation.

NATIVE CITY.

The native town and the portion occupied by Europeans must be described separately, as they have few points of resemblance.

Native City.

The former fortunately occupies the northern section of the area already described : had it been ordered otherwise by Mr. Job Charnock, and that we had the black town to windward during the S. W. monsoon, then must the Europeans have tried their fortune somewhere else : here, at least, accident has favoured us. The lower or southern division of the town which comprises *Chowringhee* is but thinly peopled ; the houses of Europeans being widely scattered, and *Ko-lingah*, which is a part of it, is chiefly occupied by natives.

The division between *Durruimtollah* and *Bow Bazar* has a denser population ; it comprises the most thickly inhabited European part of Calcutta, as well as that occupied by a great number of country-born Christians, who reside in the town with their families.

The north division between the *Bow Bazar* and *Muchoa Bazar* comprises perhaps the most dense part of the native population of Calcutta. The upper division to the north of *Muchoa*

Bazar, is, comparatively speaking, but thinly covered with habitations, presenting towards the north and east, extensive gardens, large half-dried tanks and ruinous tenements. It is surprising how much the condition of the native portion of the town has been neglected in this great city and its suburbs, in which are to be found all the faults of all the cities in India. It may not be very easy efficiently to interfere in this matter, and it may be very true that it is less difficult to find fault, than to remedy the evil complained of; but in an affair of so much importance to the public health, *something* may be done and at least ought to be tried, if only in the way of municipal or police regulation.

In the event of a contagious disease (and there is no reason why such should not occur here,) the dense state of the *Burra Bazar* and surrounding parts, the want of water courses, and means of facility for removing accumulations of filth, &c. would stand as insuperable bars to the best devised regulations of medical police. All masses of buildings should be opened out, old walls and decayed houses removed; for even under ordinary circumstances these are fertile sources of fever.

DWELLINGS.

“The people of India are not infected with that plague of building, as the Italians call it. The poor cannot afford to erect sumptuous piles, and the grandees do not care to do it.”—*Old History*.

The houses of the wealthier classes are brick-built, from two to three stories high, closely constructed and divided only by dirty, narrow and

Houses of
the Baboos.

unpaved streets ; the roofs are flat and terraced. This is the general character of that portion of the black town called *Burra Bazar*, in which are to be found, however, some residences which, on account of their peculiar arrangement, require a separate mention ; I mean the houses of the Baboos. These are uniformly built in the form of a hollow square, with an area of from 50 to 100 feet each way, which, on the occasion of Hindoo festivals, is covered over, and when well lighted up, looks very handsome. The house itself is seldom of more than two stories, the lower portion, on three sides of it, being used only for store-rooms, or for domestics ; on the remaining side, and that always the northern one, is to be found the Thakoor-Ghur, or abode of the Hindoo gods ; this is always finished with care, and when the owner is wealthy, the lustres contained in this sacred apartment are of considerable value. Above stairs are the public apartments, with verandahs, always inwards : these are generally long narrow slips, containing a profusion of lustres and wall lights, altogether affording but a mean view to an European. Jutting out from this main building are situated the accommodations allotted to the females, and family : they consist of smaller hollow squares, with petty verandahs opening inwards, and some houses have two or three sets of these zunnanahs, with one or more tanks attached, but which are generally kept in a very neglected state. Altogether, this form of building, if placed on open ground and made more roomy, would not appear ill calculated for the climate.

The mass of labouring classes live in huts, the walls of which are of mud, or of matted reed or bamboo, roofed with straw or tiles, according to the means of the occupant ; these would not be so bad, but that they are uniformly placed on the bare ground, or on damp mud, but little raised, which continually emits injurious exhalations.

Houses of the poorer classes.

Great numbers know nothing of the comforts of a bedstead, and the inconveniences to which they are subjected, are greatly increased by the pits of stagnant water often made close to their doors.

While in Ava, I was forcibly struck with the superior style of buildings amongst the natives, which, in point of airiness, elevation, and mode of construction, constitute the best habitations for the poor I have ever seen in any country ; and I have no doubt they contribute much to form the hale constitution of the Burmese as contrasted with other Asiatic races. There, every man is raised above the ground in proportion to his means, and even the poorer classes are three feet above it ; while here, nine-tenths of the entire population sleep on the bare ground. In this important matter the Bengallee is behind many savage tribes. The miserable wood-cutter on the banks of the Mississippi raises his hut as high as he can on posts, and the Guanaco of the Delta of the Orinaco climbs into the tallest palm trees, as a protection from the exhalations with which both are surrounded.

Mode of buildings amongst the Burmese excellent.

The Bengallee behind savage tribes in his mode of buildings.

Dr. MacCulloch, in his account of the Hebrides, states that, while the inhabitants had no shelter but huts of the most simple construction, which afforded free passage to currents of air, they were not subject to fever; but when, through the good intentions of the proprietors, such habitations were provided as seemed more comfortable and commodious, but which afforded recesses for stagnating air and impurities, febrile infection was generated.

In 1793 the number of houses, shops, and other habitations in the town belonging to individuals was as follows :

To natives of Great Britain,	4,300
Armenians,	640
Portuguese & other Christians, . .	2,650
Hindoos,	56,460
Mahomedans,	11,700
Chinese,	10

Total independently of Govern- ment premises,	<u><u>75,760</u></u>
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The number of premises in Calcutta to be considered as containing any population amounted in 1822 to a total of 67,519, of which 5,430 were upper-roomed houses, 8,800 lower-roomed houses, 15,792 tiled houses, and 37,497 straw huts. By the very latest returns, but little increase would seem to have taken place in either kinds of premises, since 1822.

THE STREETS.

Whoever has visited the native portion of the town before sun-rise, with its narrow lanes, and “ranked compound of villanous smells that ever offended nostril,” will require no argument in favour of widening the streets, so as to effect the two greatest improvements of all as respects the salubrity of a city, free exposure to the sun, to rarify and elevate the vapours, and to the winds to dilute and dissipate them.

Streets require to be opened out.

It were easy to point out where clearing out masses of building, and widening and new forming of streets should be effected ; but here I shall only indicate the necessity for these measures, in almost every part of the native town: the details could easily be arranged. Where new streets are formed, they should be as much as possible in the direction of the prevailing winds : all streets should have raised pavements on each side for foot passengers.

The want of watering has been severely felt in every part of Calcutta of late years, and the more the city extends, the greater is a matter of so much importance to health needed.

The absence of watering injurious to health.

Dr. Fordyce considered the dust of the streets of London, in his day, “a serious detriment to health.”

The deficiency in the supply of water is highly injurious in other ways, and in order to illustrate this point, I may mention, that during

an epidemic fever in Belfast, the quarter where water was wanting, and consequently, where cleanliness and sewerage were comparatively deficient, supplied *three-fifths* of the whole amount of fever cases.

Great value
of public
cleanliness.

It must be confessed, the natives have yet to learn, in a public and private sense, that the “sweet sensations connected with cleanly habits, and pure air, are some of the most precious gifts of civilization, and that a taste for them tends to give a distaste to degrading and grovelling gratifications: the common saying that ‘cleanliness is next to godliness,’ is founded on reason, in as much as it is conducive to moral purity as well as health and pleasure.”

DRAINS AND SEWERS.

There is probably no subject connected with the public health and comfort of a city, of more consequence than the state of the sewers.

Great im-
portance of
this subject.

Stagnation
from want of
sufficient fall
very injurious.

Great
Sewers.

Those of Calcutta throughout, I believe to be defective in number, construction, and fall, without which last the most approved plan gives no real usefulness. It is *stagnation* from want of sufficient fall in the drains, that gives rise to deleterious exhalations, and the same applies to the half-dried tanks so numerous here, and to the water retained by inequalities of soil. The great sewers should be of solid masonry, arched over; they should also have lesser communicating sewers proceeding from each house, and their fall should be such as to

admit of no arrest of their contents : such of the sewers as must terminate in the river, should have their mouths at ordinary low water mark. Open sewers, or surface-drains, should when practicable, be made in the direction of the prevailing winds, and wide, so as to admit of exposure to the sun, and free ventilation.

Some years ago a careful survey was made of the area comprised within Chitpore and Kidderpore, north and south, and from the Circular Road to the river, east and west, with the view to fixing the exact level.

State of the level from a survey made some years ago.

From this survey it resulted that the whole extent of the river bank is the highest, declining gradually towards the Salt-water Lake. The mean height of the surface of the town is about two feet below the river at its greatest height in the rains, or twelve feet above the Salt Lake at the same season. Most of the streets are on this level ; Clive Street is the highest, and Muchoa Bazar Street is the lowest. The former near Meerbhur's Ghaut is 8 feet above, and the latter, near its centre, is 6 feet below the top of Chandpaul Ghaut, which is commonly between 2 and 3 feet higher than the river in the rains at spring tides ; parallel to the river, there is a gentle slope towards Muchoa Bazar Street from Chitpore Bridge on the one side, and a line drawn half way between the Bow Bazar and the Durrumtollah on the other : south of this line there is a declivity towards the Brijeetolao. A very important fact which must form the basis of any plan for draining the town, has been

proved, by the survey of the levels of Calcutta being followed by an examination of the Salt Lake to the eastward of it, namely, the great difference in the relative heights of the river, and the Salt Lake in the rains, when one or both of these must be looked to for the purpose of receiving the matter to be carried off in draining.

In the months of July, August and September, the tides rise in the river at an average to 11 feet above the Salt Lake, and only fall to 2 feet below it; but on some days, the river does not descend to within a foot of the level of the Lake, while at high spring tide the river attains a height of between 13 and 14 feet above it. Hence the impracticability of draining the town into the river in the rains, except for a few hours during the latter part of the ebb, is as evident as the superiority of employing the Salt Lake for that purpose is manifest; that body of water remaining at a uniform height throughout the rainy season, uninfluenced either by freshes or tides, and giving a fall, even if the mouths of the drains were carried to its level half a mile beyond the Circular Road, of $5\frac{1}{2}$ feet in the mile, or about $1\frac{1}{4}$ inch in 100 feet. From this also it appears, that, if the water which descends on the surface of the town, during a heavy fall of rain, be equally distributed by cross drains into the great sewers, and these be made of a sufficient capacity and slope, no obstacle will be opposed to its free passage into the Lake.

The expediency of placing stones embedded in masonry, in certain parts of the town, to register their relative height, was suggested, and immediately ordered, so that the construction of aqueducts, drains, &c. will be an easy task, it being only necessary to examine these register stones to discover immediately whether any one spot is higher or lower than another, and to have the channels between them constructed accordingly. This idea is new, although a register of levels seems to be quite as important as a register of distances ; and might lead to the practice of their being established in other large cities, and to that of inscribing the height of places, above some level on every mile stone in the country ; for a certainty regarding the one might often be as useful to be known as the other. It follows from the above, that one or two head waters properly located would wash out the drains and empty themselves eastward of the town at all seasons.

THE TANKS.

Owing to the water of the river being brackish during a great part of the year, and unfit for general use, the chief supply for all classes of natives is derived from tanks, which for the whole town are about 537 in number, and if properly constructed, they ought generally to contain wholesome water.

The natives, however, do not seem any where impressed with the importance to health of

Importance
of pure water,
the natives not
aware of it.

Rain water
used by Euro-
peans.

purity in this element, and therefore it is that every where one finds the tanks in an impure and neglected condition, from the annual accumulations of the vegetation going on at the bottom, so as to render them progressively shallow, until at length they become the half-dried, green and slimy puddles, which so contaminate every portion of the native town. The better classes of Europeans use rain water, kept in the common Peguejars, and which on account of their great dimensions and narrow mouths, seem well adapted to the purpose.

This being the purest of the natural waters, ought to be more in use in a country where it can be so readily obtained.

Half-dried
tanks to be
filled up.

The construction of tanks on approved plans, and at convenient distances, is yet a desideratum in Calcutta: it would prove of value to the native community, not only as affording a supply of good water at all seasons, but as helping to carry off under ground moisture. All half-dried tanks should be filled up, and bathing only permitted in such as are unfit for other purposes: clothes-washing should be prohibited.

Tanks with-
in the Baboos'
premises.

The Police should look to the condition of the tanks within the premises of the Baboos; for no person ought to have exclusive property or right in what is injurious to the public health.

All I have said of the native city applies to the portions called Kurbulla, Simla, Mirzapore, Paritollah and Collingah, where defective

drainage and half-dried tanks are every where to be found ; but as details would occupy more space than such a sketch as this admits of, I proceed to notice the condition of the outer Suburbs.



THE SUBURBS.

Attention to the state of the Suburbs necessary in the first instance.

Without attention to the state of the Suburbs in the first instance, it is useless to attempt any great improvement within the city : while every square acre of the circumference is left in a state worse than that of nature, it were in vain to work in the centre. The improvement of the Suburbs too, as it will prove of the greatest benefit to health, so I think it will also be least in point of cost : here, great works in masonry will not be required.

VILLAGES ALONG THE CANAL.

Villages along the canal.

What I am about to notice is from repeated personal observation. I began north-east of the town about Chitpore, and carried my examinations toward the south, until I reached Mr. Kyd's dock-yard. I have personally examined Chitpore, Nundenbagh, Behar-Simlah, Komarparrah, and Sealdah, and find that one description will serve for all ; viz. general irregularity of ground, affording lodgement of various extents for stagnant offensive waters ; drainage every where defective, and good tank water scarce. There are also belts of jungle and underwood, obstructing ventilation. In all these villages the replies of the natives confirmed what, indeed, any one could have predicted, the general prevalence of remittent and intermittent fevers, with their sequelæ, during the whole period of the drying process, from October till June. The

Their miserable condition.

new earth dug from the canal, and now heaped all round, might readily be made use of to level and fill up the thousand pits and half-dried tanks, which now form such fertile sources of noxious exhalation in these villages.

The banks of the canal should also be carefully preserved from accumulations of filth, and rank vegetation. This applies especially to the head of the old Canal at Baliaghatta, which should be deepened, and where I have observed the banks to be in a noisome and neglected state.

Canal and
its banks.

Spacious tanks should be dug at convenient distances, and the earth thus procured, made use of to fill up the irregularities of ground. All underwood and belts of jungle trees should be rooted out.

ENTALLY.

From the frequency with which I have seen the unhealthy state of the suburb of Entally set forth in the daily prints by persons professing themselves inhabitants, I had expected to find more of the sources of fever there than in the last mentioned villages; but in truth they are all bad enough, and the difference as regards Entally lies chiefly in this, that a large proportion of its inhabitants are Christians, and can make their grievances known. Entally is fully in as neglected a state as any locality pointed out in this paper, and any one need only observe, to know the remedy. It is so obvious, that I need not enter on what would be but repetition. The

Entally as
bad as any of
the suburbs.

drains here and at Bally Gunge are all in a neglected condition, and require clearing, with a proper fall. There is also much bamboo and other jungle all round, which ought to be rooted up. I know of no quarter near Calcutta so much in need of this measure.

BALLY GUNGE.

Here, I beg to solicit attention for a moment to the beneficial effects resulting from very simple, and apparently trifling improvements, executed at my suggestion some years back, in the cantonment of Bally Gunge.

Former un-
healthiness of
Bally Gunge
remedied at
the suggestion
of the author
in 1821.

Having shortly before served with troops in the field in the very unhealthy countries of Orissa, along the borders of the Chilka Lake towards Ganjam, and in the interior of Gundwana, on the Mahanuddy, I was appointed to the charge of the Governor General's Body Guard at Bally Gunge, in 1821; and there, I found severe remittent fever, such as I had first seen and personally suffered from in the jungles, prevailing to a great extent, and I learnt that it had been so for years. To ascertain the cause of a state so different from what I had been led to expect, I made several careful examinations of the localities, and discovered that in the men's lines alone, besides stagnant drains, there were sixty pools and pits of various dimensions, to all which, and the neglected state of the grounds around the regimental hospital, I had no hesitation in referring as a sufficient cause of the extreme unhealthiness of the corps. I represented the

necessity of drainage with a sufficient fall—the filling up of the pools and pits, and the construction of two large tanks at a proper distance from the lines. The Governor General, the Marquess of Hastings, was pleased to order all my suggestions to be carried into effect, and the result during the three following years, was, a reduction in the frequency and intensity of fever, as remarkable as it was satisfactory. I had intended to have brought the details to the notice of the authorities, but I lost my papers in a shipwreck on the coast of Ava, when proceeding thither, during the late war, with the Body Guard. The fact, however, is as I have stated.

BHOWANEEPORE.

This is the most populous of the native suburbs, and I believe it was the most severely visited by the epidemic remittent fever of 1833. To this calamity it would seem peculiarly exposed through its low, closely-built, and ill-ventilated streets, its great stagnant ditches, lined with rank vegetation, its back ground of extensive marsh and underwood, and its innumerable half-dried tanks and pools. The native residents, whom I questioned on the spot, spoke of the last year's fever as universal, and declared its ravages to have been more extensive than the oldest of them had ever previously seen. No doubt all this is true, for epidemics are observed in all countries to fasten with the firmest gripe on such localities.

Bhowanee-
pore ; suffer-
ings of the Na-
tives in 1833.

Good tanks are very much wanted in this Suburb, the inhabitants having now to proceed to the distant "General's Tank" in Chowringhee, that being their only source for the supply of wholesome water.

ALLIPORE.

Allipore a
better locality.

Allipore has long been considered a healthy locality, and was early occupied by Europeans. It still contains the favourite villa of Warren Hastings. Cossipore and Russapuglah are also esteemed more healthy than Calcutta, and I believe with justice. This Suburb (Allipore) from being better raised and better drained, did not suffer nearly so much from the fever of 1833, although natives of respectability assured me it carried off at the rate of eight out of ten of the occupants of each house in the villages to the south and east of us during that season. This circumstance is well deserving of notice when compared with the state of Garden Reach, where scarcely a house escaped the epidemic fever, and I knew one, in which every individual was attacked. Finally, it may be said with truth, that in all the places noticed, there are not six square acres of soil occupied by natives, which do not contain marsh and other concentrated sources of periodic fevers, which in the course of time establish their inevitable sequelæ of spleen and fatal diarrhæa—the brief history of the life and death of two-thirds of all the poor inhabitants around us.

General un-
healthiness of
the Suburbs.

Where all positions are so bad, I find it difficult to select, even by comparison, what are usually designated by medical topographers healthy situations, and unhealthy situations. The sections Boitakana and Entally, I am informed by a gentleman, now 50 years resident in Calcutta, were considered healthy, when about 35 years ago, he first took up his residence at the former place ; but since the construction of the canals, they have become notoriously the reverse : fevers formerly infrequent, are now general, especially on the drying up of the rains, and are commonly attended with yellow suffusion of the surface. The cause of this change, appears to me to arise from the banks of the canals impeding the natural drainage towards the east ; and the inquiries made among natives would lead to the belief that the inhabitants suffer severely at all seasons. Those who frequent the borders of the Lake and places about Ullabarea, to collect the reeds used for the manufactory of floor mats in common use here, are unusually short-lived, and in the season of the inundation, in 1833, most of them died.

Difficulties
in their present
state to say
which is best
and which the
worst.

KIDDERPORE.

I thought I had visited the worst of the Suburbs in Bhowaneepore, but Kidderpore, which is next in populousness, greatly surpassed it. I think I never saw in any part of Bengal or Orissa, a locality so generally bad, and the result corresponds entirely with its condition.

Kidderpore;
its neglected
state.

Fever is general throughout, even in the healthiest season, and the want of good water forms an universal complaint amongst the inhabitants. There is not a square rood that is not in a surprising state of neglect, and the portion between the bridge-end and Kyd's dock is one entire jheel. I need not again speak of the remedy for all this ; but I beg to mention what I would consider a great improvement to this and the other Suburbs, viz. flood gates, from the Tolly's nullah, to wash out the drains. Those from the left bank would fall into the Hooghly, clearing out the drains of Garden Reach in their course, whilst those from the right bank, having swept through Bhowaneepore, should enter the Maharatta Ditch, and pass along the Circular Road, terminating in the head of the Canal. Calcutta itself would be much improved by this measure!

From their situation and neglected state, the great Suburbs of Bhowaneepore and Kidderpore are peculiarly exposed to the effects of inundations such as occurred here in 1833.

HOWRAH.

Howrah. Howrah is directly opposite to Calcutta, and, like the parent city, it has its proportion of marsh in its rear.

The oldest
Suburbs of
Calcutta.

This would appear to have been the oldest of our Suburbs, and to have been considered by Captain Hamilton as preferable for the site even

of the great emporium. Speaking of Howrah in his time (1688-1733) he says,—

“ On the other side of the river are docks made for repairing and fitting their ships’ bottoms, and a pretty good garden belonging to the Armenians, that had been a better place to have built their fort and town in, for many reasons. One is, that, where it now stands, the afternoon’s sun is full in the fronts of the houses, and shines hot on the streets that are both above and below the fort; the sun would have sent its hot rays on the back of the houses, and the fronts had been a good shade for the streets.”

Captain Hamilton’s description of, in 1688-1733.

For the following particulars I am chiefly indebted to Dr. Duncan Stewart, many years Civil Surgeon of Howrah, and the founder of the excellent establishment for European seamen.

This Suburb is long and straggling, extending along the river about six miles, its greatest breadth being about two miles.

The country around and inland is very low; the river bank, on which the better of the houses are built, being like Calcutta, the higher, and having at some places an elevated upright river front, shewing that the deep channel formerly took this course. Of late years a sand bank has been rapidly forming south from the headland at Howrah Ghaut, which now crosses the

Description.

stream near to Calcutta, and extends down to Seebpore.

Houses. Inland, the country is very low, and like that beyond Calcutta, is devoted to rice culture, with here and there patches of underwood ; it may be said to be in a humid state for nine months in the year. The number of houses is shewn in the following table :

Mehals.	Brick Houses of one Floor.	Brick Houses of two Floors.	Matted and Thatched Houses.	Tiled Huts.	Native Chowks.
250	1982	1215	47178	573	1

DRAINS.

Drains. There are no *puckah* drains, but the water has free course; the bank being high, and great attention being paid in repairing the drains that exist.

In the back part of the Suburb the necessary fall being wanting, there exist many stagnant pools and half-dried tanks.

WELLS.

Wells. The number of *puckah* wells is 54—kutchawells 216—tanks and pools 380.

PUBLIC BUILDINGS.

There are three churches capable of accommodating about 150 persons ; there are likewise two hospitals, one for natives supported by voluntary contributions, and furnishing medical aid to about 30 to 40 patients daily, and the hospital for European seamen established by Dr. Stewart at Howrah Ghaut : the number of patients admitted into this latter from the ships in the river have been, within the last twelve months, 348. There is besides the above a District Charity Fund similar to that in Calcutta for the relief of needy Christians. The Government Salt Golahs form an extensive range of building, very defective in original construction and constantly in need of repair. The roads and houses in their vicinity are often encrusted with a deposit of salt, and the natives employed suffer in consequence from ophthalmia and other diseases of the eye.

Public
Buildings.

There are seven or eight docks on this side of the river, the older ones being the most spacious and considered the best. A Slip Dock has lately been built, and with these exceptions all the rest are mud docks. In all of them much attention is paid to the proper accommodation of the workmen.

POPULATION.

Population. The following is the population, according to a census taken last year :

Resident Hindoo Adults.	Resident Hindoo Children 6 yrs. old and under.	Hindoos in Service.	Mosulmaun Adults.	Mosulmaun Children 6 years old and under.	Mosulmaun Servants.	Native Lodgers or Passengers.	European Adults.	European Children.	East Indian Adults.	East Indian Children.	Total.
33,223	20,342	8,106	12,154	4,395	2,019	3,153	43	24	63	49	83,571

Howrah
healthier than
Calcutta.

Dr. Stewart considers that the Howrah side of the river is the more salubrious from the S. W. monsoon blowing fresh along and across the river. The inhabitants residing along the bank he considers healthier than such as occupy the low back grounds bordering on the marsh. He likewise considers the locality of the Bishop's College healthy, and ascribes this to the circumstance of the grounds about it being kept in a state of dryness by sluice drains.

Bishop's
College
healthy.

In the docks, he says, the natives employed in stripping off old copper from the ships' bottoms frequently suffer from " sudden attacks like cholera or apoplexy."

POPULATION OF CALCUTTA.

The population of Calcutta has long been an object of curiosity, and till lately has never, I believe, been accurately ascertained.

Population.

In the year 1800, according to the report of the Police Committee, furnished to the Governor General, the population of the town, exclusive of the Suburbs, was estimated at 500,000, and according to another calculation in 1814, at 700,000.

The former return was given on the authority of the Magistrates of Calcutta, but the data on which it was founded cannot be now ascertained: the latter computation was adopted probably on a consideration of the above estimate, taken in connection with a supposed increase in the wealth and prosperity of the town. The employment however of four Assessors in 1819, to revise the whole of the rates assessed upon the houses, buildings and premises of Calcutta, seemed to the Magistrates to present a favorable opportunity of obtaining an accurate census of the population, which one of the gentlemen of the Committee undertook to prepare from authentic statements furnished by the Assessors, the result of which is here submitted.

Recent employment of Assessors.

The following were the returns given for the four divisions of Calcutta :

Total Christians,	13,138
Mahomedans,	48,168
Hindoos,	118,203
Chinese,	414
Total	<u>179,917</u>

The great difference between this total amount and former estimates is very striking and a general opinion prevailed that the population could not but exceed the total returned by the Assessors.

But it has been ascertained that the extent of Calcutta, from the Maharatta Ditch at the northern extremity, to the Circular Road at the southern circuit of Chowringhee, is not more than four and a quarter miles, and that its average breadth is only one mile and a half. It is not improbable therefore, that the large estimates made of the population of Calcutta at former periods, may be owing to the crowds of artisans, labourers, servants and sircars, and to the numerous strangers of every country which constantly meet the eye in every part of the town. Indeed the numbers entering the town daily from the Suburbs and opposite side of the river, were estimated by the Magistrates at 100,000. This was done by stationing sircars and peons at all the principal outlets of the town. The peons counted the passengers by flinging to the sircar a cowrie for every hundred passengers, noting separately the carriages and hackeries, and the average of different returns gave an influx of about 100,000 individuals, besides carriages and horses. Upon the whole then, it appeared to be the opinion of the Magistrates of Calcutta, from all the returns laid before them, that by taking the resident population at about 200,000, and numbers entering the town daily at 100,000, we shall have a statement of population probably not much wide of the truth.

Mode adopted for ascertaining the population.

It has been ascertained in the course of the inquiries which led to the results above given, that the number of respectable and wealthy native house-holders is not increasing in Calcutta; on the contrary, that they have been decreasing.

W. Hamilton states that the great native families who now contribute to its splendor are of very recent origin; indeed, scarcely ten could be named who possessed wealth before the rise of the English power, it having been accumulated under our sovereignty, chiefly in our service, and entirely through our protection. In the visits which the Magistrates are continually making to the various parts of the town, they do not observe the same rapid progress of building in the Native as in the European quarter, whilst they are perpetually struck with the appearance of ruinous and decayed premises, either vacant, or occupied by the remnants of wealthy families.

We may naturally ask what has led to this? It has been conjectured that the mercantile adventurers of Calcutta had retired to spend their wealth in other quarters, and that the old and indigent habitants of the place had not been able to preserve their former station in the increased prosperity of the place, but we very much fear that this is not the cause assigned by the natives themselves.*

* Calcutta Journal.

I have been favoured with the following return by Captain Birch. It is the latest, and the most correct :

English,	3,138
Eurasians,	4,746
Portuguese,	3,181
French,	160
Chinamen,	362
Armenians,	636
Jews,	307
Western Mahomedans,	13,677
Bengal Mahomedans,	45,067
Western Hindoos,	17,333
Bengal Hindoos,	120,318
Moguls,	527
Parsees,	40
Arabs,	351
Mugs,	683
Madrassees,	55
Native Christians,	49
Low Castes,	19,084
	Total 229,714

MORALS.

“ It is the duty of the medical philosopher to investigate the nature and causes of moral evil as well as of physical ills—and for this good reason, that both are inseparably connected, in causes, effects, and consequences.”
—*Dr. James Johnson.*

A knowledge of the morals of a people of great importance to the medical topographer.

It has been asked, says Hennen, what has a medical topographer to do with the morals of the natives of a country? And it has been asserted that their immoralities cannot affect the health of the troops quartered among them, if

proper discipline be observed. These opinions, however, are founded upon a very superficial view of the subject. The soil and the inhabitants, if I may be allowed the expression, always react on each other. A sober, industrious race of inhabitants, for example, will have a greater desire to improve their country than men of a contrary character, and will also possess greater physical power to carry their desire into execution. Place such a body of men in a district over-run with noxious weeds and timber, and fast degenerating into a morass; and can there exist any rational doubt that they will clear it sooner, and longer preserve it in that improved state, than men of a different disposition? Place in a similar situation, or even in the district thus improved, a body of men who are idle and intemperate, and the immediate result will be, that the soil will deteriorate for want of proper care, the weeds will re-appear, the drains will become obstructed, the edible products of the earth will lessen in quantity, and diminish in their nutritive quality: the inhabitants will become unhealthy from the bad state of their grounds; and the diminution of their physical powers thus produced, will disable them progressively more and more from remedying the causes of the evil. Many of these effects will doubtless first be felt in their own persons, but it is undeniable that they must ultimately operate on their visitors. On this obvious principle is founded the axiom of medical topography "that a slothful squalid-looking population invariably characterizes an unhealthy country."*

* Dr. Hennen's Note.

Moral character of the Bengallee.

The Bengallee, unlike the Hindoo of the north, is utterly devoid of pride, national or individual. His moral character is matter of history; and I think it were unworthy now, when we are looking forward with such well-founded hope to the improved results of European knowledge and example diffused amongst the natives, to bring into relief their worst qualities, or those engendered by ages of atrocious tyranny, civil and religious. Let those who like it, follow the Bengallee in his practice of falsehood and perjury—his insensibility to the feelings of others—his “perfection in timidity”—his cruelty and ferocity—his litigiousness—his physical uncleanness and obscene worship; for my part, I prefer turning my recollections, although it may be a digression, towards that class of Hindoos whose sense of military honour forms so powerful an incentive to good conduct in civil life—the up-country sepoy—a class of men at all times respectable, when justly treated. When treated otherwise, as I have seen them, and that under the privations of active service, their worst, instead of their best qualities, may be elicited; yet under a humane and just treatment, together with the example of their officers, it is surprising how respectable the sepoy may be rendered, even in the estimation of the soldiers of His Majesty’s army, who are not lavish of compliments. Those who observed the good conduct, on all occasions, of the Body Guard in Ava, felt satisfied that Captain Williams’s account of the Bengal sepoy is in no way exaggerated.

Excellent character of the Hindoo sepoy.

In Calcutta, the influence of education and European example is seen to influence the moral character of the more enlightened classes of natives in a surprising manner, and in a thousand ways. Here I shall only mention one of these—I mean the humane and charitable feeling evinced by the educated Baboos, as contrasted with that of the bigotted or, as they call themselves, the orthodox Hindoos—the one bestows largely ; the other gives nothing.

The influence of education in Calcutta.

Charity of the educated as contrasted with the orthodox Hindoos.

An hospital for the sick poor, says Dr. Tennant, was never known in India before the establishment of the British, though there were for dogs, cats, &c. !!

EMPLOYMENTS, CUSTOMS AND AMUSEMENTS.

It has been well observed by Cabanis, that it is difficult to separate the customs of a people from their employments. In many countries some employments depend on the customs of the people, and in others again the customs are but the necessary result of the employments to which the greater portion of the people give themselves up, or those who exercise the greatest influence in society ; thus manners, in some countries, have rejected certain kinds of occupations, whilst these again are encouraged in others to the extent of becoming objects of passionate taste, or wants of necessity. Under the barbarous institutions and absurd prejudices of the Spartans and Romans, all the labours of industry and of commerce withered. Arts which wanted delicacy, and that were carried on by

Cabanis's just views on the subject.

Influence of
Government
on employ-
ments, cus-
toms and
amusements.

the rudest hands, could not progress: they were a kind of disorder in the State. Most of the Egyptian works seem to have been the product of slave labour, whilst all those of Greece were the occupations of freemen: those of the Phœnicians and Carthaginians were in keeping with the ingenious commercial industry of a people who placed riches above all things. The labours of the Romans were those of a conquering people, and differed but little whether in the highest or lowest stage of their fortunes. Their habits were essentially predatory. Employments, customs and amusements are likewise powerfully influenced by climate and form of government: the effects of both these are every where conspicuous in Asia. The languid and slothful habits of the Hindoos, together with the absence of motive for labour, are all rightly ascribed by Mill to their "wretched government, under which the fruits of labour were never secure."

Influence of
climate.

Climate again, which enables the Hindoo to live heedless and slothful, forces the native of Holland to be careful, laborious and attentive to excess; or, as remarked by Cabanis, he must render back to the ocean, that soil, which a free Government and his own care enable him to secure.

These three, architecture, weaving and jewellery, says Mill, are the only arts for which the Hindoos have been celebrated; and even these, with the exception to weaving, remained in a low state of improvement. He might have added that all three are arts found

to flourish under despotic Governments, and that frequently to the exclusion of others of more general utility. There are no remains of great public works in any of our eastern dominions—none certainly of utility belonging to the Hindoos; and most of those that belonged to their more civilized conquerors of the Mahomedan faith, have fallen into decay. I have never seen but two or three natives who seemed to be fully alive to the value of public works.

With exception to a few educated Baboos, the Hindoo, of whatever fortune, still retains his narrow ideas and parsimonious habits. His pious contributions, and the expenses of the Zunanu, are the greatest drains upon his income: in his dress and table there is little devoted either to the purposes of elegance or magnificence, unless the insipid nautches, marriage and religious festivals deserve that name.

Were I to mention all the customs of the Hindoos that are injurious to health, I should write a respectably sized book. The institution of caste is of itself an enormous injury to public health, because prejudicial to public happiness. It is truly said by Ward, to be at war with every passion of the human mind, good as well as evil.

Injurious effects of caste.

The abominations of the Kooleen Brahmins is alike destructive to health and morals, by its excessive poligamy, through which it is said that in Calcutta alone above a thousand abortions are procured monthly. You, procuress of abortion,

is said to be a common expression of reproach amongst females who pretend to respectability !! The ordinary poligamy, together with the early marriages of the Hindoos, are productive of indescribable miseries. The numbers of festivals and the great multitudes that on these occasions are obliged to sleep on the bare ground, exposed to all the inclemencies of the weather, and irregularities in diet, are also great sources of injury to health. A festival always brings a crowd to the Native Hospital.

Injurious consequences of borrowing.

The general practice of borrowing even among the poor, and that at a most enormous interest (as high as 30 per cent.) is a heavy tax on industry, and keeps the lower orders in a wretched state of dependence. A Hindoo seldom makes provision for the future: he borrows to supply his most common wants, and then evades payment as long as he can. I am told this is the case with all (even the best paid) labourers employed by Europeans in Calcutta, and that not satisfied with borrowing from the Shroffs, they are largely paid in advance by their employers. The extraordinary sums spent at marriages as well as at the celebration of the rites for the repose of the dead, entail future poverty: not a vestige remains, says Ward, by which the married pair may be made happy or wealthy; the whole sum evaporates in show, noise, or smoke. The Bengallees are a loquacious people only in bargaining and wrangling; the noise at one of their haunts or markets, goes beyond any thing of the kind in any European country;

Poverty caused by lavish expenditure at various ceremonies.

they are on the other hand never seen assembled in groupes, like all European people, to discuss news or matters of public interest. The long fasts likewise practised by the lower orders are injurious, as is the Hindoo habit of dress, especially in the cold weather. Away from the ceremonies of religion, marriage, &c., the Bengallees have no public amusements,—no manly sports or exercises,—nothing to develop the muscular frame. They take no pleasure in agriculture—“their prejudices prevent them from rearing poultry, and but few possess the convenience of a kitchen garden.” If the Bengallee be in easy circumstances, the whole day is passed in eating, smoking, and chewing the pawn, reclining and sleeping. It is a proverb amongst them, that the life of a woman being more sedentary, is happier than that of man, and that nothing but the dangers of bringing forth children “makes them content to be men still.” The natives are very fond of pantomimical entertainments, and I am told that all manner of jugglers thrive here. They are also much given to musical entertainments, of which the singing at their nautches is the best specimen, though sufficiently monotonous to an European ear; but in regard to their band music (if I may so call it) at marriages, &c. and on religious ceremonies, never was the maxim *de gustibus*, &c. more true than here. It is impossible to speak of Bengallee music with any feeling short of disgust, or to compare it to any thing but the noise made by cows in distress, with an admixture of the caterwaulings of a feline congregation and the occasional scream of an

They have no public amusements.

Indolence proverbial amongst them.

Fond of pantomimical amusements.

Bengallee music.

Eager pursuit
of gambling.

affrighted elephant. It is said of the natives that our superiority in every respect is readily acknowledged, but that we are altogether deficient in music!! Gambling is eagerly pursued, and the numerous gaming houses wherein stolen goods are receiving from servants in order to entice them to play, are every day crowded in certain parts of the town and Suburbs. The languid game of *Pucheesee*, is the one in general use on these occasions.

CONCLUSION.

When the child is born, the father puts a piece of *money* into his hand, and when the man dies, the same father employs two or three persons of the vilest caste, with long bamboos "to keep the limbs and bones in the fire." The ceremony at birth and at death is performed with the same want of natural feeling: in the one case there is no rejoicing, and in the other "no children or relations are seen weeping over the pile;" none of the tender feeling cherished in burying the dead among Christians, and "no vestige that can remind the living of their deceased friends." When we reflect on the habits and customs of the natives, their long misgovernment, their religion and morals, their diet, clothing, &c., and above all, their *climate*, we can be at no loss to perceive *why* they should be what they are.

DIET—CLOTHING—BEDDING—FUEL.

“ La diète atténuante, que les législatures de beaucoup d'ordres religieux ont prescrite n'a pas l'effet de diminuer les desirs vénériens (au contraire,) mais d'enflammer, ou de dérégler l'imagination, eu diminuant les forces, et de rendre par là, les hommes plus faibles, plus malheureux, et plus aisés à dominer.”—CABANIS.

Whether the founders of the Hindoo faith were aware of it or not, is immaterial to the present inquiry ; but there can be no question that, by depressing all the physical energies through a diet purely vegetable, they fastened with a stronger hand the moral bonds of Brahminical domination on the people. It has always appeared to me a great mistake to view the diet of the Bengallee *as prescribed by climate* : on the contrary, I believe it to be far below the standard required for his support under all the changes of his seasons : in the hot weather and rains, it is not sufficient to supply the great waste, and in the cold weather, its poverty is eminently injurious to his health.

The diet of the Hindoos prescribed by the founders of religion and not by climate.

W. Hamilton, speaking of the luxuries of woollen clothing and fires used by Europeans in the cold season, says, the natives enjoy neither luxury, and suffer exceedingly all night ; they shiver and lament, and in the morning continue benumbed, both in body and mind, until the sun acquires some height, dispels the fogs, and invigorates them by its cheering beams.

Sufferings in the cold season from want of clothing.

Who can doubt the beneficial effects of a more generous plan of diet, and better

clothing, on both mind and body ; but the Brahmins have ordered it otherwise ! Poverty instead of exciting pity in this country, only gives rise to the reflection : “ He belongs to a degraded class ; he is suffering for the sins of a former birth, and is accursed of the gods.”

The diet
common to the
Bengallee.

Let us now enquire what the actual diet is, which supports the miserable existence of the Bengallee. I do not here speak of the well-paid labourers of Calcutta, or of the servants of the Europeans, (the Topographer has little to do with the habits or luxuries of the well-paid or the wealthy) but of the great mass of the people ; and it is truly surprising in what a state of indigence they are placed by their own inveterate habits of indolence derived from long political and religious misrule. In some places their wages do not exceed a penny a day ; in others three halfpence, and in others two pence. To enable us to form some idea how these people are able to maintain their families on so small a sum, it is necessary to consider that their firewood, herbs, fruits, &c. cost them nothing ; (that is, in the country) they wear no shoes nor hats ; they lie on a mat laid on the floor ; the wife spins thread for her own and her husband’s clothes, and the children go naked at all seasons.

A man who procures a rupee monthly, with his wife, and two children, eat two maunds of rice in the month, the price of which is one rupee ; they eat twice in the 24 hours, at 8 A. M.

and at 10 P. M. From hence it appears, that such a day-labourer must have some other resource, otherwise he could not live : if he is a Musselman, he rears a few fowls ; or if a Hindoo he has a few fruit trees near his house, and he sells the fruit. If by these, or any other means, the labourer can raise half a rupee or a rupee monthly, this procures him salt and a little oil, and one or two other prime necessaries ; though vast multitudes of the poor obtain only from day to day boiled rice, green pepper pods, and boiled herbs ; the step above this is a little oil with the rice.* The lowest class often want beetle and salt, and in place of the latter use the ashes of various plants containing different saline substances. Altogether, we may conclude with Dr. Hamilton, that “ whoever has travelled much with the natives and been witness to the weakness of their constitution, in resisting the changes of air or water, will agree with me in saying that those who enjoy a diet which includes animal food and strong liquors in moderate quantities, are best able to resist the influence of unhealthy climates, and the sudden change of air.” The more rational religion of Mahomed permits a better system of diet to its followers, and they are therefore on the whole more robust and more capable of sustaining effort than their Hindoo brethren ; if the very poor of them imitate the Hindoos in their nakedness and poverty of diet it is through necessity alone, not choice.

A better system of diet conducive to health and vigour.

* Ward.

CLOTHING.

Wretched clothing : remains the same under all the changes of season.

If the Bengallee had any thing deserving the name of clothing, the circumstance of its remaining the same under all the various changes of their seasons would render it useless. The kummerbund, of the protecting influence of which so much has been said, is in reality too slight, and worn too low down over the haunches, to be any protection to the abdomen. The head and feet are uncovered, and during the cold season the poor are eager to obtain shreds of coarse woollen cloth, and their general dislike of this season proves that they suffer much from it. The garments of a farmer for a year (two suits) cost about two rupees. Diseases of the skin are of extraordinary prevalence among the lower orders, arising no doubt from poverty of diet and the absence of due clothing.

BEDDING.

Bedding of any kind but little used.

Of bedding, but little need be said, as there is in reality none in use by the lower orders. Many poor natives, says Ward, sleep in places where, if some people were to set their feet, they would receive cold. Almost on the soft earth, with a single cloth for their covering, multitudes may be seen every night lying by the side of the street in Calcutta. One night's lodging of this kind would, in all probability, hurry an European to his grave. A remarkable illustration of the value of comfort in this article is given in the Madras report of Drs. Ainslie, Smith and Christie, wherein it is said

Remarkable illustration of the value of comfortable bedding.

that the inhabitants who were elevated ever so little above the soil on bed-frames, or who were defended by rugs, were decidedly more exempt from fever and its fatal consequences, than such as had not these advantages.

FUEL.

I am not aware that fuel is used, even by the wealthier classes of natives, for purposes other than the dressing of food : fire, as a luxury in the cold season, or to dispel the excessive damp during the rains, is unknown to the natives generally. Though familiar with the establishments of the Baboos of Calcutta, I have never seen any thing like a fire-place in any of their houses : when they do use fire in their rooms, it is in the form of a moveable grate filled with charcoal. The common fuel of the poor of Bengal is bamboo, certain kinds of reeds, and cowdung mixed with husks of rice, dried in the sun. In Calcutta, the fuel in general use is the soondree wood from the Sunderbunds ; and a servant who receives monthly wages of six rupees, expends half a rupee on this article.

The luxury of fire-places unknown to the Natives.

POPULAR MEDICINE AND SURGERY—EMPIRICS.

Those who have not considered the extreme deficiency of medical knowledge, even in our own days, in European countries, otherwise highly civilized, and who are not aware of the difficulties of medical science, have expressed much surprize at the degraded state of medicine and surgery amongst the Hindoos. It may be

Medicine and Surgery in a degraded state not matter of surprize.

All the institutions of the Hindoos opposed to advancement in these humane sciences.

said with truth, I think, that all their institutions, but especially those of religion, were in opposition to any great advance in this humane pursuit, both from the feelings that were aroused by them, and those they suppressed. The active humanity of all Europeans, and the habitual indifference to the feelings of others, so general in Asia, would of themselves go far to account for the difference in knowledge in the healing art, without going deeper into their relative institutions of Government, and national character.

Even medicine and surgery, says Mill, to the cultivation of which so obvious and powerful an interest invites, had scarcely, beyond the degree of the most uncultivated tribes, attracted the rude understanding of the Hindoos.

Leisure of Brahmins worthlessly used.

Though the leisure of the Brahmins has multiplied books on astrology, on the exploits of the gods, and other worthless subjects, to such a multitude "that human life," according to Sir W. Jones, "would not be sufficient to make oneself acquainted with any considerable part of Hindu literature, he yet confesses, there is no evidence that in any language of Asia, there exists one original treatise on medicine considered as a science." "Surgery," says an author, who believes in the high civilization of the Hindoos, "is unknown among the people. In the case of gun-shot or sabre wounds, all they did was to wash the wound and tie it up with fresh leaves, the patient during the period of convalescence, eating nothing but the water gruel of rice." The examples of

Miserable state of Surgery.

native surgery that have come under my observation were much worse than this ;—all cases of wound or fracture having been tied so as to impede circulation and thereby invariably cause mortification of all the parts. Many such cases have been presented at the Native Hospital. Of native medicine and medical treatment, I cannot speak more favorably. The articles employed in medicine by the Hindoos are doubtless extremely numerous, and some of them are of great value : there are others the value of which is not well ascertained, and the practitioners have not the semblance of correct instruction in this or any other department of professional knowledge: were any of them to seek it, he could only be referred to the “ hundred sections of a thousand stanzas each” of the Ayurveda—the very title of which is unknown to most of the present day, who seem to have forgotten that one of the fourteen retnas or precious things, which their gods are believed to have produced by churning the ocean, was a learned physician. The inductive mode of reasoning is unknown to the Brahmins ; they have never been observers of common facts : there are no treatises on particular diseases : all they have of record in medicine is in the shape of diffuse general system, or systems, of which the greater part relates more to mythology than medicine. Professor Wilson, to whose learning and accuracy of observation we hope to be under further obligations, states that “ in the treatment of disease, the Hindoo writers are essentially deficient, and the notion of augmenting efficacy by multiplying ingredients disfigures

Examples
brought to the
Native Hospi-
tal.

The practice
of Medicine
equally worth-
less.

Inductive
mode of rea-
soning un-
known to the
Brahmins.

Ignorance and rapacity of empirics a great addition to the general misery.

their works with a prodigious number of the most preposterous and ridiculous compounds." The Professor adds, "that in proportion as the work is more modern, the compounds become more extravagant, and assume a more important place in practice." "The imperfection of their medical system," says Ward, "and the ignorance and rapacity of the quacks who bear the character of physicians, greatly adds to the general misery." After this, it were unprofitable to pursue the native empirics, whether Hindoo or Mahomedan, in all their shameless impostures on their fellow countrymen. It is sufficient to remark here, that they are not to be surpassed by any of their trade in any country, for mystery of deportment or self-sufficient and impudent knavery.

The foundation of an *English* School of Medicine of vast importance.

The abolition for ever of the barbarous rite of the Suttee, will doubtless hand the name of Lord William Bentinck to the grateful remembrance of remote ages in India; but the foundation of an *English* School of Medicine (the success of which is no longer doubtful) will prove of far greater importance, in as much as the diffusion of European medical science, with its collateral branches, must prove one of the most direct and impressive modes of demonstrating to the natives, the superiority of European knowledge in general, and that they must cultivate it actively, if they would rise in the scale of nations.

CHOWRINGHEE—THE EUROPEAN QUARTER.

The European quarter.

Chowringhee extends south of the native town, and from the corner of the Durrumtollah road,

is a mile and a quarter in extent: it faces the glacis of Fort William, and is altogether as well arranged as the locality admits: the ground is also well drained, excepting those portions of it occupied by natives, which are in an extremely neglected condition. The houses of this quarter, and of Garden Reach, have an imposing exterior, which incautiously obtained for them from strangers, the magnificent appellation of palaces!

The style of building is Grecian, ornamented with spacious verandahs, the pillars of which are generally too lofty to afford much protection from the sun's rays. Each house has a piece of garden ground, which gives to this quarter as well as to Garden Reach, a great advantage in point of airiness over the commercial part of the European city.

Style of building.

It becomes me to speak with diffidence on an architectural question; but I cannot help thinking that a different arrangement of the interior of the houses, with an eastern and western aspect, the entrance being always to the east, would be more suitable to the climate. Facing in this manner to the cardinal points, the eastern face becomes rapidly a complete shade in the afternoon, at all seasons; whereas the present mode, with a northern entrance, causes the portico, which should be arched and not pillared, as now too common, to be raked by the sun from 6 to 9 A. M. and from 3 to 6 P. M.; besides admitting currents of chilling wind during the N. E. monsoon.

Construction of the houses defective.

Mode to determine the proper aspect.

A modern scientific writer proposes an easy mode, if it be a correct one, of determining the proper aspect.

The most healthy exposure, he says, is to be found "by cutting one of the trees that grow there transversely with a saw, observing the rings; the side of the tree on which the distances between each ring is widest is the most healthy exposure, and the windows of the house, all other circumstances being the same, should ever face that way."*

Buildings in Bengal should be raised on arches.

All dwellings in countries subject to inundation, like Bengal, should be raised on arches of from 4 to 8 feet in rise, and have western as well as southern verandahs, the lower portion to be arched, and the upper pillared. Private rooms should for coolness and convenience, be larger and loftier than are now common, and their windows fewer in number, loftier and narrower. The importance of space in private apartments is forcibly impressed by the fact stated by Dr. Edwards, "that persons who have what is called delicate lungs, owe in a great degree the difficulty and oppression which they feel, to the smallness of their apartments, a difficulty which decreases on going into a large room or into the open air." The lower floors of our Calcutta houses as now constructed, become sooner or later unfit for habitation, depending as to time, on the quality of the building material and the nature of the locality. I have known the ground floors of some houses to become useless in five

* Encyclopædia Britannica.

years—so that, even on the score of economy, it were best in the end to build on arches.

The lower ranges of dwellings are generally believed to have an attractive power over marsh exhalations ; and hence, in malarious countries, the second stories of houses are always found to be more salubrious than the first. I have frequently known slow fever contracted by persons occupying the ground floors of our houses and which yielded only on a removal to the upper rooms. I have also known severe visceral congestions produced by occupying the same situations during the cold season, as offices of business. Troublesome ophthalmies, various local rheumatisms, and swelled face, are the more ordinary effects of inhabiting the floor ranges, and will be found very prevalent amongst the natives employed as writers in the Government and mercantile offices of this city.

Injury to health from occupying the ground floors of houses.

Hitherto, private dwellings have been erected by natives and other speculators on their own plans, at the cheapest rates, and for the mere purpose of letting to the highest profit: no wonder then, that they should be constructed without reference to locality, climate or convenience.

Private dwellings have been erected by the natives as a speculation, and are not built with reference to climate or convenience.

That this is a matter of importance to health will be made evident from the following report of Mr. Ralph of H. M.'s 2nd regiment of Foot, on the difference of health between the upper and lower stories of barracks occupied by that corps in the West Indies. "By a calculation it

Great importance of the subject.

appears that in the month of August, one case of fever presented itself in every *twentieth* man of those quartered on the *ground floor*, and in each thirtieth man of those in the upper floor. During that part of September which has elapsed, each *twenty-fourth* man was attacked with fever of those stationed in the *upper rooms*, and each fourteenth among those in the *lower*.”

Dr. Fergusson found two-thirds more men were taken ill on the ground floors at St. Domingo, and the same observation was made by Cullen at Porto Bello in 1740. Walcheren afforded several instances to the same effect.

FORT WILLIAM.

Latitude of
Fort William.

The citadel of Fort William stands in lat. 22-33 N. and longitude 88-20 E. about a quarter of a mile below the town, and is superior in strength and regularity to any fortress

Construction.

in India. It is of an octagon form, five of the sides being regular, while the forms of the other three next the river, are according to local circumstances. The works are scarcely raised above the level of the surrounding country, and

The Ditch.

make no imposing appearance. The ditch is dry, with a cunette in the middle, which receives the water of the ditch by means of two sluices

The Garrison.

that are commanded by the Fort. The garrison usually consist of a regiment of European infantry and one of sepoys, with a detachment of artillery. For purposes of defence five times this number would be requisite.

THE BARRACKS.

There are five barracks for the accommodation of officers, one of which is three-storied. They are generally well arranged, and excepting the Staff Barracks, they are not intended for habitation on the ground floor.

The barracks
five in number.

The Artillery Barrack for the men is 420 feet in length by 320, height 36 feet. On the peace establishment, it is arranged for 1,000 men, and in war for 1,782. The Infantry Barrack 313 by 300, and 27 feet high, accommodates 900 men on the peace establishment and 1,602 in war. Both are damp on the ground floor.

Dimension.

HOSPITALS.

There is no room within the Fort for sick accommodation, and the Garrison Regimental Medical establishments are therefore placed in one of the three buildings composing the General Hospital. From this it has always been the anxious desire of the late Inspector General Burke, a man of talent and extended experience as a Military Surgeon, to remove the sick of H. M.'s troops, and an hospital on a suitable scale was erected on his plan and recommendation five years ago. The building is airy and commodious, and beyond all comparison superior to any hospital at the presidency; but after having lain empty since its completion, it was recently, and for reasons I am not acquainted with, given over for the accommodation of the chief Civil and Criminal Court.

New Hospital
for H. M.'s
troops on Dr.
Burke's plan
—well con-
structed.

Opinion as to
the aspect and
mode of erect-
ing Hospitals
in Bengal.

So far as I have been able to consider the matter, I am disposed to think that hospitals in the Lower Provinces should face directly east and west, with a spacious verandah on these two faces.

By this arrangement, the convalescents would have complete shade in either verandah, morning and evening for exercise—an advantage not possessed under the now prevalent mode of building, with a southern and northern aspect. It may be objected, that by the eastern and western aspects, the long face of the buildings will be exposed morning and evening to the direct rays of the sun; but spacious verandahs will obviate this, and it should be recollected that in the end the most expensive hospital will prove the least so in lives. It is a solecism in economy, says Dr. Mosely, to have a bad one. I lost (he continues) more value in men at Castille Fort and Up Park in three months from the miseries of the hospital alone, than would have been adequate to the expense of erecting a proper one for all the troops in the island—meaning Jamaica. St. Sauveur remarks of a badly constructed hospital at Corfu: “ C’est là, que le soldat alloit au devant de la mort plutôt que de la santé.”

The selection of the aspect now generally adopted in Bengal appears to originate in the desire to solicit, what is called a “ thorough draught,” by means of a thousand doors and windows, such being considered necessary to due ventilation. I believe this to be a mistake, and one

from which a large portion of sick suffers injury, especially during the cold season, when the strong northerly current is felt to be very uncomfortable, even by persons in health. The most liberal ventilation should doubtless prevail in all hospitals, but this is best secured, and a lower temperature maintained, by space, especially elevation, aspect, &c. and a proper adjustment of doors and windows, open down to the floor, with alternate apertures in the upper and lower walls, fire-places, &c. &c. In lower Bengal and countries like it, all such buildings should be raised on six or eight feet arches, left open for ventilation.

THE RIVER.

By some persons who have spoken of our climate, a large portion of the evils under which we suffer, have been ascribed to the *river*—its supposed overflowings—its sluggish tides—foul waters—its muddy and slimy banks, and the action of a vertical sun upon them, &c.; but I shall view the river in a different and more friendly light, *as the purifier of our city.*

Certain am I that without this great scavenger, to whose tides we owe more than Captain Hamilton ever dreamt of, we should now be in a worse condition even than when he left us, an hundred years ago. The truth is that, under moderate supervision on the part of the police, the river-banks are inoffensive; and along their whole extent, although crowded

The river of service as a scavenger.

with building for a space of nine miles, disease will be found less prevalent by far, than in the interior quarters, towards the east; in short the causes of fever are to be traced to other and more palpable sources than the river-bank, which is the most elevated of all our grounds, being from three to four feet above the surrounding levels. The causes of unhealthiness in Garden Reach after the salt-water inundation of 1833, could be readily traced to the state of the back grounds: no one ever thought of looking for them in the river-bank. The annual rise of the Ganges and its branches is

Annual rise
of the Ganges
—its branches.

	<i>Feet.</i>	<i>Inch.</i>
In May,	6	0
„ June,	9	6
„ July,	12	6
Half of August,	4	0
	<hr/>	
Total..	32	0

Temperature
of the surface
water.

From above 350 observations of temperature made by Mr. G. A. Prinsep, of which the details are given in the Journal of the Asiatic Society, it would appear that “the mean temperature of the surface water exceeds 81° Faht. every where between Calcutta and the sea.” In the dry season the mean rate of motion is less than three miles per hour: in the rainy season, and while the inundations are draining off, the current runs from six to seven and even eight miles in particular situations.

The rate of
motion.

The river is at its lowest in the beginning of March, and the freshes are at their height in September, when the tides are scarcely visible

off Calcutta, and the river water is "perfectly sweet, far beyond Saugor in the open sea."*

THE SALT LAKE.

The Salt Lake lies about three miles east of the town, extending upwards of four miles north and south, it is divided into two portions, the eastern division averaging 3 feet in depth, its area being seven square miles or about 12,000 beegahs, the western is two feet in depth, and its area five and a half square miles or about 10,630 beegahs. The borders are generally under rice cultivation, with occasional patches of reed grass.

Description.

To drain the Lake for the purposes of native agriculture is therefore easy, but to deprive the ground of the sources of noxious exhalation is not so. It is not sufficient to convert the ground into a state of soft low meadow land; for the most dangerous exhalations are those which are retained, and occasionally emitted from under a crust of earth during the drying process, whereby they would appear to acquire unusual concentration and prove the origin of the worst fevers.

Mode of draining the Lake.

It is necessary that the grounds be *thoroughly* drained, leaving none of the characters of marsh, otherwise it had better be left as it is; its present condition being one of far greater safety than such a half-drained soil as that obtained from the marsh of Chartreuse, for instance, near Bordeaux, which caused in the year 1805 alone, 12,000

Necessity of a thorough draining.

Injury to health at Bordeaux from partial draining.

* Tides of the Hughlee, by Jas. Kyd, Esq.

persons to be affected with fever, within the city, of whom 3,000 died within five months !

Different modes of effecting the drainage.

Two modes of effecting the drainage suggest themselves ; the one by letting in the river during the rains, and thereby gaining a succession of deposits of the river silt, so as gradually to fill the lake, and thereby bring it in time to a level with the surrounding land ; this would seem the easiest ; it imitates the simple operations of nature, and would be the cheapest ; but perhaps not the most conducive to health. Another mode is by a deep and well constructed canal, so as to effect the drainage ; but as even this must to a certain degree prove a receptacle for noxious matter, and offer a considerable surface for evaporation, a close line of umbrageous trees should be planted along each side of the canal, as being powerfully attractive of marsh exhalation.

This property in trees was practically known to the ancients,* and is now beneficially exemplified in Demerara, and other parts of Guiana, “ where the humid heat constantly cherishes the “ seeds of disease.”

Great importance of the subject as affecting public health.

The ground cleared from water, should be well ploughed and cultivated,—the ploughing to be done during the heaviest rain, so as to prevent exhalation ; for it is during a certain stage of the *drying process*, that marsh exhalation is most concentrated, and it has been observed in many countries, that the drying up of brackish water

* Regond de L'Isle says of the Malaria of Italy that various obstacles form barriers which they cannot pass, and against which they deposit themselves.

is more injurious than that of either salt or fresh alone. A succession of crops purifies and evaporates the soil, and thereby obviates exhalation ; but they should not be of rice, or such crops as require profuse irrigation. The want of attention to some of the precautionary measures above hinted at, has neutralized the advantages that would otherwise have resulted from extensive draining, executed in some parts of France and Italy ; and I have only thus long dwelt on that of the Salt-water Lake, because I believe its proper performance to be a matter of great importance to this city, as far as regards the prevention of disease ; and I need not here insist on the superior efficacy of *preventive* measures, such as have advanced in our own country apace with our civilization ; and altogether banished from us some of the severest calamities that have ever afflicted the human race.

ROADS AND COMMUNICATION.

Of roads leading to the interior, there are but two that merit notice, and these are not of importance in a general or commercial sense. I mean what is called usually the great Military road to Benares, made by the Government, and the Pilgrim road to Juggernaut, begun by bequest of Rajah Sookmoy Roy of Calcutta in 1810, and said to have been finished in 1820, but like most undertakings of this kind, it has fallen into decay, either through neglect, or the difficulties arising from badness of material, and the force of the annual floods. The Benares road has not answered the expectations of

Benares Mi-
litary road—
and that to
Juggernaut.

Permanent inland communication only by water and that is open at all seasons.

Government, or of the public. The portion which traverses the plains is nearly impassable at all seasons for wheeled carriages and completely so in the rains. Of permanent inland communication therefore, by road, Calcutta is deficient; but nature has been bountiful in the other way, water communication being free and ample in all directions but the west, and at all seasons, if the hotter months be excepted, when both the Cossimbazar and Jellinghee become so shallow, as to be navigable for the smallest description of country boats only. The interior communication is then kept up by the larger vessels and steamers through the Chandna river, a secondary branch of the Ganges, navigable at all seasons.

Of beaten pathways there are numbers in all directions, over which the post letter-bags are carried to all parts of India, at the average rate of three and a half miles per hour. The first dawk was that established in 1765 between Calcutta and Allahabad.

CLIMATE.

“L'ensemble de toutes les circonstances naturelles et physiques, au milieu desquelles nous vivons dans chaque lieu.”—CABANIS.

“The best observations upon climate often lose half their value from want of an exact description of the surface of the country.”—MALTE-BRUN.

What, says Dr. A. T. Thomson, is climate?

What is climate?

“Geographers understand by climate any space distant from the equator and poles; and regarding the term in this sense, the old geographers divided the hemisphere into thirty climates.”

Dr. Thomson's views of climate.

“For our purpose, we must regard climate in a different point of view. It does not merely imply the geographical locality in reference to latitude on the surface of the globe; but the elevation also of that locality above the mean level of the surface of the earth. Temperature in this respect, operates almost as powerfully as it does in the relative position of a spot, as far as regards its proximity to the equator.”

“The inhabitants of a region elevated a thousand feet above the level of the sea live in a very different climate from those who inhabit its margin, although both places may be in the same degree of latitude. Temperature, therefore arising from the direct and radiated beams of the sun influenced by latitude and altitude, constitute climate.”

That such a definition of climate, even including elevation, can never lead to a full under-

standing of the subject, in a medical or physical sense, will be evident from the following facts:—although Peking is nearly a degree to the south of Naples, the latitude of the former place being $32^{\circ} 54'$, of the latter $40^{\circ} 50'$, the mean temperature of Peking is only 54° Faht., while that of Naples is 63° .—But as the thermometer at the Chinese capital sinks much lower during the winter than at Naples, so in summer it rises much higher.

The rivers are said to be frozen for three or four months together, from December to March; while during the last embassy, in September 1816, a heat of 90° to 100° was experienced in the shade.

It is well known that Naples and other countries in the extreme south are strangers to such a degree of long continued cold, and are not often visited by such heats. We must then look for the causes of physical climate elsewhere; and, however much it may be influenced by elevation and latitude, we shall find other and powerful accessories; such as the nature of the soil; the quantity of moisture; the prevailing winds; the electrical states of the atmosphere and the physical character of the adjacent countries and seas, the neighbourhood of forests, &c.

Climate viewed in the most extended sense—the right view.

As viewed by the medical topographer, climate should be taken in the most extended sense. “L'ensemble de toutes les circonstances naturelles et physiques, au milieu desquelles nous vivons dans chaque lieu.” I have

not the time, neither do I pretend to the ability requisite to do so comprehensive a subject justice ; so elaborate a discussion would demand an application of the most refined principles in physical science.

There is probably no kind of investigation to which the maxim of Professor Adam Ferguson, "that all observation is suggested by comparison" applies with greater force than that of climate, whether the object of research be physical or medical. One man can do but little ; yet that little, if consisting of facts carefully observed, will help to form the general stock, and prove useful. It is by such observations, made at different times and places, that such a science as that of climate can alone be perfected.

Malte-Brun's division of physical climate shall here be adopted, because it is the most simple and natural I am acquainted with, and because it marks the points to which the inquiries of the topographer may be advantageously directed. Physical climate, he says, comprehends the degree of heat and cold, the drought, the humidity, and the salubrity which occur in any given region of the earth.

Malte-Brun's
division of
physical cli-
mate and its
causes.

The elements of physical climate are nine in number :

- 1st. The action of the sun upon the atmosphere.
- 2d. The interior temperature of the globe.

3d. Elevation of the earth above the level of the ocean.

4th. The general inclination of the surface and its local exposure.

5th. The position of its mountains relatively to the cardinal points.

6th. The neighbourhood of great seas and their relative situation.

7th. Geological nature of the soil.

8th. Degree of cultivation and of population at which a country has arrived.

9th. The prevalent winds.

To these may perhaps be added—

10th. Position in respect to the equator.

11th. Position in respect to large rivers or lakes.

12th. Position in respect to forests.

I mention “position in respect to the equator,” because I think that in omitting it, Malte-Brun has erred on the opposite extreme to the ancient geographers, who made it to be every thing, while he makes it as nothing.

Professor Leslie's notion of climate.

Professor Leslie—no mean authority on such a subject—says, that “latitude and local elevation form, indeed, the great basis of the law of climate, and any other modifications have only a partial and very limited influence:” now, though in a medical sense, this is obviously not borne out by facts, still, it is evident that latitude is deserving the consideration of the medical topographer, from its palpable effect of giving obliquity to the solar rays, and the quantum of space through which these pass in reaching the earth's surface.

I feel it proper to be thus particular on the nature and causes of climate, as it is a matter of great importance, in a medical sense, to have it rightly defined, from amidst conflicting authorities, what *we are really to understand by the term*; for without this, how shall we direct the enquiries of the medical topographer.

ACTION OF THE SUN UPON THE ATMOSPHERE.

The following tables will exhibit the state of the atmospheric temperature here, its weight and humidity, during the years specified. The thermometer in the open air is found to vary from 40° to 110° in Calcutta.

Temperature, weight and humidity in Calcutta during six years.

		Maximum.	Minimum.	Remarks.
1830.	Thermometer,..	90°... 4	53° ... 3	
	Barometer, ...	30 ... 131	29 ... 512	
	Hygrometer,...	16 ... 9	1 ... 5	
1831.	Thermometer,..	95°... 8	57° ... 8	
	Barometer, ...	30 ... 122	29 ... 456	
	Hygrometer,...	14 ... 5	1 ... 5	
1832.	Thermometer,..	96°... 9	54° ... 6	Mean Barometer 29° 764
	Barometer, ...	30 ... 071	29 ... 467	
	Hygrometer,...	15 ... 2	1 ... 6	
1833.	Thermometer,..	97°... 2	61° ... 1	Mean temperature 78°
	Barometer, ...	30 ... 095	29 ... 485	
	Hygrometer,...	17 ... 3	2 ... 3	
1834.	Thermometer,..	99°... 4	58° ... 9	
	Barometer, ...	30 ... 022	29 ... 470	
	Hygrometer,...	13 ... 8	1 ... 4	
		in the sun	on the ground	
1835.	Thermometer,..	110°... 2	42° ... 0	Each entry is the average of a month's observations.
	Barometer, ...	30 ... 038	29 ... 480	
	Hygrometer,...	13 ... 9	3 ... 2	

The difference between sensible heat and that indicated by instruments, is no where more remarkable than within this city during the hot months, where, from the length of time the houses, walls, and roads are getting heated by

Difference between heat indicated by instruments and sensible heat.

Cooling property in trees,

the sun, the nights are rendered even more oppressive than the day from copious radiation going on during the former period. Chowringhee and Garden Reach have a perceptible advantage in this respect, and also in the great evaporation from trees, which tends so much to reduce temperature. This delightful property in trees should always be turned to our advantage; and where the grounds are kept in proper order, a moderate number of trees will prove grateful and beneficial in every sense. This will be especially the case in the hot dry season; and during the rains the evaporation from trees can add but little to the humidity already existing in the atmosphere. It has been computed that a country covered with trees emits more vapour by one-third, than one even covered with water. It is this property that gives to the shade of vegetables, a coolness so much more effectual and agreeable than that of rocks or walls. Dr. McCulloch in his sweeping condemnation of trees, &c. down to the very flower pots, goes a length unwarranted by any known facts: it is surely unphilosophical to view every thing in nature as made only for man's destruction.

Mean temperature in Calcutta for 12 months.

The mean temperature of each month in Calcutta may be seen by the annexed table.

January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
66° 2	69° 8	86° 0	85° 4	85° 7	83° 7	81° 8	82° 0	82° 8	79° 2	74° 2	66° 6

INTERNAL HEAT.

Some philosophers have sought the cause of climate in the internal heat of the globe.

The subject of the interior temperature of the earth has engaged the attention of scientific men in various countries, but it is only of late that any thing like precise information has been obtained. From experiments the most accurately made it is now clearly ascertained, that in proportion to the depression below the earth's surface, so does the temperature steadily increase; and, even when the depths were very small the elevation was quite perceptible. From one experiment of Professor Phillips we find that in a mine at a depth of 525 yards below the surface, the temperature was 78° Faht., while the mean temperature of the place was 47 $\frac{1}{2}$ °.

Internal temperature of the Globe supposed the cause of climate.

Inferior temperature.

The temperature of seas and lakes being much below that of continents, the inference is that in summer the atmosphere which is in contact with the masses of water must always be less heated than that portion of it which is contiguous to the earth. The temperature in the caves below Paris is constantly between 52° and 54° of Fahrenheit; while at the surface the difference between summer and winter exceeds 90°. At the bottom of Joseph's well, Cairo, latitude 30°, at the depth of 210 feet, the thermometer stands at 70°. In the mines of Mexico, latitude 20°, at a depth of 1650 feet, it is 74 $\frac{3}{4}$ °, appearing to augment in approaching the equator. A scientific friend informs me that at Bombay, he found the tem-

Temperature at different depths and in different countries.

Temperature in Bombay.

In Fort
William.

perature near the surface in the cold season to be 82° , and at Poonah 78° . The temperature at great depths, I have not been able to ascertain. At a depth of 75 feet 3 inches in Fort William, the thermometer stood at 82° , while above ground, it ranged in the shade at about 76° .

ELEVATION OF THE GROUND.

Cold increases with elevation, and for every 100 yards of altitude the thermometer sinks one degree.

With the elevation of the land, cold increases in a very rapid progression, being at the rate of one degree to every hundred yards of altitude; and this beneficent appointment of nature considerably increases the number of habitable countries in the torrid zone: "in ascending from Bengal to Thibet, we imagine ourselves in a few days transported from the equator to the pole."

The site of Calcutta is said to be, on the average, but little if at all above the level of the tides at Saugor: in the diplomatic language of Asia, "what more need I say" as to the choice of our position?

GENERAL AND LOCAL ASPECTS.

The general aspect should be distinguished from the local aspect. The general declivity of a country, large in itself, does not exclude the most opposite local declivities. It may, however, be admitted as a general principle, that the positive sum of all the local aspects is in the same direction as the general aspect.

This principle can only be applied to spaces of great extent ; for example, the entire tract of country through which a river flows. Every one knows of what effect as to temperature, is the exposure of a soil relatively to the sun. A hill inclined 45 degrees to the south, when the sun is elevated 45 degrees, receives solar rays perpendicularly, whilst upon a plain the same rays strike the soil under an angle of 45 degrees, that is, with one quarter less of force ; and a hill inclined 45 degrees to the north, will be struck by the solar rays in a horizontal direction, which makes them glide along its surface.

Effect of aspect on temperature.

Malte-Brun, speaking of the northern hemisphere, says that the *south south west* and *south west* situations are the warmest of all ; whilst on the contrary, those of the *north east* are the coldest. The general aspect of the valley of the Ganges is about east and west, with an inclination of the delta to the south.

Aspect of the valley of the Ganges.

POSITION OF MOUNTAINS.

Mountains act on climates in two ways. They attract the vapours suspended in the air ; these vapours, by their condensation, produce clouds and fogs—often also, these assemblages of watery substances, which the winds waft in every direction are stopped in their devious course by chains of mountains in the elevated valleys of which they continue to accumulate. These effects are still more sensibly felt, when a chain of mountains is crowned with extensive forests.

Mountains act on climate in two ways.

Elevated lands in Bengal have no influence.

The elevated lands in Bengal merit the name of inequalities more than hills, and are mostly situated in the districts of Bheerboom, Sylhet, Chittagong, and along the eastern boundaries of Tipperah. They are limited in extent, and exert little or no influence on our climate.

EFFECTS OF THE NEIGHBOURHOOD OF THE SEA.

Effect in moderating temperature.

The neighbourhood of the sea moderates the excess of temperature, besides contributing, according to Pouillet, through evaporation, one of the most important sources of atmospheric electricity. In hot climates the maritime regions are not so warm as the centre of the plains; of this we have an annual example in the marine current of the south west monsoon.

Calcutta how affected by the vicinity of the sea.

Calcutta is situated about a hundred miles from the sea, but so level is the country that the tides ascend in the dry season as far as Sook-sagur, being 140 miles from Saugor Point.

In the beginning of March, when the S. W. monsoon sets in, the currents set up the Bay of Bengal, and gradually raise the sea at its head several feet, raising the Hooghly river with it, and that long before the freshes are felt. This continues till October, when the pouring of the rivers into the Bay, during the rains in July, August and September, and the change of the monsoon to N. E. in the end of October, give the current a set in the contrary direction, and gradually restore the sea and river to their condition in the previous March. The effect of

the two monsoons upon the currents, and the height of the sea in the Bay of Bengal, may therefore be considered, as that of two long unequal tides during the year—eight months of flood and four of ebb. From the point of lowest low water in the dry season to that of the highest high water in the freshes, is twenty feet ten inches. The greatest mean rise of the tide, from low to high water mark in the freshes, is ten feet.

The smallest mean rise of the tide in the dry season, neap tides, is four feet. The bores in the Hooghly occur only in the highest, or alternate spring tides: their appearance may with certainty be predicted by the season of the year and the parallax of the moon. They are greatest under the influence of the S. W. monsoon, and are only felt in those portions of the river where the peculiar form of the sands, and the direction and set of the tides in any particular reach actuate their rise.*

Persons who speak confidently, and enter into minute details on the tides and levels, assert that we are only protected from irruptions of the sea, by the counter currents of the rivers, and the friction of the tides against their banks: they state the tides in the Salt Lake to be but two feet above the mean level at Saugor, and, consequently several feet at flood tide, below that at Saugor. Of the truth of some of these assertions we had a calamitous illustra-

The tides and levels.

Inundation of 1833.

* Vide the interesting paper by Js. Kyd, Esq., Trans. As. Society, from which the above is collated.

tion on the 20th and 21st May, 1833 ; when the sea, backed by a storm from the E. S. E. and S. E. overran the low countries along the coast from Balasore along Hidgelee, and up to Tumlook and Diamond Harbour, making a breach over the Sunderbunds as far north as Calcutta, and extending its devastation as far east as Dacca. There have been many irruptions of the sea within fifty years, but none to equal this last in violence and extent. For some days the barometer stood at 28 inches and 8 decimals, being lower than it had been known for years : the thermometer averaged 84°.

Its calamitous effects.

The tide, which ran for seven hours, rose to a height of 12 feet above its ordinary level, destroying embankments and buildings of every kind, while the storm levelled the trees : nothing stood within the influence of tide and wind, and the loss of human life and destruction of cattle must have been enormous.* Saugor Island was covered seven feet deep, and out of a population of 7000 persons, few escaped. The rains were nearly a month later than usual in setting in, and the ordinary cultivation was arrested from the saturation of the soil with salt. The starving survivors from these united calamities crowded about the outer Suburbs of Calcutta, and were at last reduced to the necessity of supporting the parents' lives by the wretched and unnatural traffic in their children, the most emaciated of whom sold at last for *one rupee*. Government did much to relieve the more pressing necessities

* Vide page 7, giving an account of the inundation of 1737.

of these poor people ; but there was much that no power could relieve. Towards the end of August, there broke out a severe epidemic fever which by the end of September and during the drying process, ripened into terrible violence—carrying off, according to the reports of respectable natives, nearly three-fourths of the remaining population to the south and east of us. Neither did Calcutta escape : thousands of the natives died, particularly in the Suburbs nearest the lands inundated in May—even the Europeans suffered severely, though there were not many casualties.

GEOLOGICAL NATURE OF THE SOIL.

The internal nature of the soil must have an influence on climate in a variety of ways. All grounds are not heated equally soon. One soil quickly parts with its acquired heat, while another retains it for a long time. Exhalations, which vary according to the nature of the soil, rise into the atmosphere, and become identified with it. Clayey grounds, and those which are impregnated with salt, cool the atmosphere ; extensive accumulations, when they are dry, augment the heat. The general soil of Bengal is clay, with a considerable proportion of silicious sand, fertilized by various salts, and by decayed substances, animal and vegetable. Both the upper and sub-soil are generally pervious to water, but on an average depth of 20 feet is found a tenacious clay : at this depth too, brackish water is found. In sinking wells in the vicinity of Calcutta, no springs of fresh water were reached at a depth of 179 feet.

Influence on
climate in va-
rious ways.

In the old magazines and newspapers printed in Calcutta, I find very frequent mention of earthquakes ; but in none of these does there seem to have been any material injury sustained, which looks as if the causes were remote from us. Of the surpassing fertility of the soil—“ *the work of the Ganges*”—nothing need here be said ; it has been the theme of admiration of all travellers from the earliest times ; and according to Bernier, gave rise to this proverb amongst the Portuguese, English and Hollanders, viz. that there are an hundred open gates to enter into the Kingdom of Bengal, and not one to come away again.

INFLUENCE OF THE LABOUR OF MAN—GENERAL POPULATION.

Influence of cultivation on health.

Without cultivation, few climates would be salubrious or agreeable, and it is by its means that man exercises so powerful an influence upon the temperature of the air.

Let us contemplate a desert country, the rivers, abandoned to themselves, become choked and overflow ; and their waters serve only to form pestilential marshes. A labyrinth of thickets and of brambles overspreads the most fertile hills. In the meadows, the unsightly wild mushroom, and the useless moss, choke the nutritious herbs ; forests become impenetrable to the rays of the sun ; no wind disperses the putrid exhalations of the trees which have fallen under the pressure of age ; the soil, excluded from genial and purifying warmth of the air, exhales nothing but

poison ; and an atmosphere of death gathers over all the country. But what do not industry and perseverance accomplish ? The marshes are drained ; the rivers flow in their disencumbered channels ; the axe and the fire clear away the forests ; the earth furrowed by the plough is opened to the rays of the sun and the influence of the wind ; the air, the soil, and the waters acquire by degrees a character of salubrity ; and vanquished nature yields its empire to man who thus creates a country for himself.

Agriculture must be much improved in Bengal before the European, in the language of Malte-Brun, can be said to have created a country for himself. A Hindoo field is described by Mill to be in the highest state of cultivation, where only so far changed by the plough, as to afford a scanty supply of mould for covering the seed, while the useless and hurtful vegetation is so far from being eradicated, that where burning precedes not, the grasses and sterils which have bid defiance to the plough, cover a large portion of the surface. The same author concludes that "every thing which savours of ingenuity, even the most natural results of common observation and good sense, are foreign to the agriculture of the Hindoos."

Agriculture but little improved in Bengal.

I cannot find that the example of European superiority has had much influence on the state of agriculture around the metropolis. It is certain that in the cold season the markets are supplied with excellent vegetables of every kind ; but beyond this I believe matters are much the

Example of Europeans of little influence.

same as in the days of Job Charnock. The general crops are of rice.

In the appendix to the Parliamentary Reports for 1831, I find the population of the 24-Pergunnahs, Suburbs and City rated at 1,225,000.

THE PREDOMINANT WINDS.

Influence of the prevailing winds on the other elements forming climate.

The united influence of all the elements which constitute physical climate is variously modified by the prevailing winds ; and all their variations depend on the equilibrium of the atmosphere, the heat of one climate and the cold of another, exercising a continual influence on each other.

The Monsoon:

The northern parts of a great continent will sometimes send forth their cold air towards the southern parts ; and sometimes they will receive warm air in return. The monsoon always changes sometime after the equinoxes, and constantly blows towards that hemisphere in which the sun is found. The action of this luminary on the atmosphere, is therefore plainly one of their causes ; the cold air from the mountains of Thibet following its course for half the year, and that from the southern seas, during the other.

The south west rainy monsoon, the most remarkable of our periodical winds, begins on the Malabar Coast in May, and reaches Delhi by the end of June, extending to the north eastern parts of Afghanistan, but greatly modified.

It prevails more in the mountains than the flats of the Punjaub : the hills and valleys of Cashmere have their share of it, and it gradually loses itself westward in the valley of Peshawur, where it appears only in clouds and showers. On the Coromandel Coast it is retarded, the clouds brought by the S. W. winds being detained by the Ghauts. It reaches Bengal by the 15th June.

When not influenced by elevated lands, this monsoon generally prevails north of the equator from April to October, accompanied by tempests, storms and rain, while a north-east wind blows during the other six months. The periodical winds that prevail in the Bay of Bengal extend their influence over the flat country, until they are diverted by chains of mountains into another direction, nearly correspondent, however, with the course of the Ganges.

In the south of Bengal, the prevalent winds are north and south ; in Behar east and west, and the same takes place in Assam, following the course of the Berhampooter.

Table of winds
during 4 years
in Calcutta.

That both our monsoons exercise a beneficial influence on health cannot be doubted, but especially the south-west, from its prevalence during the greatest heats, and from its power of thoroughly ventilating the country. Stagnation would prove immediately destructive to health in a climate where there are so many various and abundant sources of noxious effluvia, which would ripen into activity by such a cessation of wind

as should admit of their accumulation in any one place, or in such streets, for instance, as those of the native portion of Calcutta.

Table of the winds at noon during the years 1832-5.

	N.	N.W.	W.	S. W.	S.	S. E.	E.	N. E.	Calm.	
	Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.	
In 1832 the wind was	44	60	26	44	67	49	4	71	9	No register 1 day.
„ 1833 „ „ „	56	39	14	30	115	24	25	32	29	Ditto ditto 2 days.
„ 1634 „ „ „	53	52	12	25	99	22	26	40	36	
„ 1835 „ „ „	41	65	31	84	41	45	12	31	7	Ditto ditto 8 days.
Total,..	194	216	83	183	322	140	67	174	80	

THE RAINS—SOURCES OF AQUEOUS EXHALATIONS—
HUMIDITY.

Great extent of the sources of aqueous exhalations in Bengal.

Without taking into view the expanse of the Bay, the coup d'œil of a good map of Bengal will at once shew how bountiful nature has been to that country, by means of her majestic rivers with their innumerable tributaries, in yielding the sources of aqueous exhalations, and it were gratifying to the medical topographer, could his description be limited to these. There are not any lakes in Bengal resembling those of Scotland, or Canada, but there is a profusion of extensive jheels, which may be either denominated shallow lakes, or deep morasses.

A large proportion of these in the dry season contain little or no water, but during the rains pre-

sent immense sheets, over which boats of the greatest magnitude may be navigated, and some are navigable to a certain extent throughout the year. There is reason to believe that nearly all these stagnant sheets of water rest in what were at a remote period the channels of large rivers, which have since altered their courses and now flow in another direction. The area of Bengal and Behar is 149,217 square miles, and with Benares not less than 162,000 square miles. The following proportions of the surface are grounded upon many surveys after making allowance for large rivers :

	Parts.
Rivers and lakes (one-eighth),	3
Deemed irreclaimable and barren (one-sixth),...	4
Sites of towns and villages, highways, tanks, &c. (one twenty-fourth),	1
Free land (three twenty-fourths) remain liable to revenue,	3
In tillage (three-eighths),	9
Waste (one-sixth),	4
	<hr/>
	Total,..... 24*
	<hr/>

According to another calculation Bengal contains 97,244 square miles : if from this that portion of Tipperah which is independant, the tract of the Sunderbunds, and other wastes equal to 13,244 square miles, be deducted, the remaining inhabited country will be equal to 84,000 square miles ; but the extent of waste and surface occupied by rivers, marshes, &c., seems here greatly under-rated.

* W. Hamilton.

When all this is considered, along with the complete saturation during five months in the year, of every inch of soil—even that which may not be actually inundated—the extent and sources of aqueous exhalation—the commerce of land and water—may be imagined.

Queries put by the author to a scientific officer, and his answer.

To a scientific officer, well acquainted with the localities, I put the two following questions :

1st. Taking the area of the 24-Pergunnahs to be 882 square miles, what proportion should you say the water surface bears to the land, on the 30th May and the 10th of October, the first being just before the rains, and the latter just after?

2nd. What proportion does the cultivated land bear to the waste and jungle within the said area?

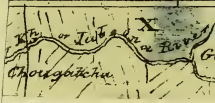
Answer to Question 1st.—I should say that on the 10th of June, you might assume one-twentieth part as the proportion of water surface to land in the 24-Pergunnahs. On the 10th October, perhaps 17-20ths would be a fair proportion of the water to the land, of course I mean by water, ground from which exhalations would arise.

Answer to Question 2nd.—The cultivated land may be about 14-20ths ;—water, 1-20th ;—roads and villages, 2-20ths ;—uncultivated, 3-20ths.



Sketch Map
 with a View in some measure
 to illustrate
 the causes of Physical Climate.

- References.*
- I... Calcutta and Suburbs.
 - II... River Hoogly.
 - III... Ground under Rice Cultivation.
 - IV... Partially cleared Sunderbuns.
 - V... Jungly tract of the Sunderbuns.
 - VI... Salt Water Lake
 - VII... Embouchures of the Ganges.
 - VIII... Rivers intersecting the Delta.
 - IX... Marsh in rear of Howrah.
 - X... Marshes of various extents.
 - XI... Bay of Bengal.



The following Table will shew the annual fall of rain during the years specified. The average annual fall is about 60 inches.

Table of the annual fall of rain in Calcutta during six years.

	<i>Rain.</i>	<i>Inches.</i>
1830,		63,28
1831,		57,50
1832,		49,26
1833,		60,56
1834,		68,73
1835,*		85,50
	Mean ..	64,14

The following are the average rates of evaporation for the dry months:—January, three inches—February, five—March, seven—April and May, nine inches.

From a table of 4,028 sick, who passed through the hospital at Havannah, in the course of seven years, it appears that the *months* in which the sick exceeded the monthly mean in number, were those from May to October inclusive, in which, (with two exceptions) the rain was above the general monthly average of seven inches. Again the *years* in which the rain was above the annual mean of $76\frac{1}{2}$ inches, are mostly those in which the sick exceeded the average annual number of 575 cases. The above is from the work of Dr. Edwards on the influence of physical agents on life, and is here given with the view of pointing to an interesting branch of inquiry—the connexion of the the rainy season with disease.

* 16 inches fell on the 10th May, in 24 hours.

EFFECTS OF CLIMATE—INFLUENCE OF HIGH
TEMPERATURE ON HEALTH.

“Si l’histoire naturelle a besoin d’une bonne géographie physique, la science de l’homme a besoin d’une bonne géographie médicale.”—CABANIS.

Under the head of “effects of climate” I shall offer some cursory observations on what is usually called by physicians, “medical climate,” and also some brief notices of the geography of disease as connected with our climate and seasons.

Temperature and humidity the most influential as affecting public health.

Temperature and humidity being the elements that give activity to terrestrial emanations, and all the external causes affecting health derived from locality, I shall now consider them apart from the subjects above classed. Much has been said and written on the superior capabilities of adaptation to climate in man over the lower animals; but if the power and just application of the arts of civilization be deducted, I am disposed to think, with Dr. Johnson, that the difference would be but small; for even with these aids, we find that in this climate “many die suddenly, others droop and all degenerate” very much, as with the lower animals of more temperate regions.

Gibbon, after stating that the Roman soldiers, from their “excellent discipline,” maintained “health and vigour in all climates,” adds, that “man is the only animal which can live and multiply in every country from the equator to the poles. The hog seems to approach the nearest to our species in that privilege.” It is true, as

stated by the historian, that men do "*live*" in other than their natural climates, but their existence is very unlike to the health and vigour of the Roman soldier.

"The truth is, the tender frame of man is incapable of sustaining the degree of exposure to the whole range of causes and effects incident to, or arising from vicissitudes of climate, which so speedily operate a change on the structure, or at least the exterior of unprotected animals. The object of these remarks, which at first sight might seem irrelevant, will now appear. Since it is evident that nature does not operate more powerfully in counteracting the ill-effects of climate on man, than any other animal, it follows that we should not implicitly confide, as too many do, in the spontaneous efforts of the constitution, but on the contrary, call into its aid, those artificial means of prevention and melioration, which reason may dictate and experience confirm. In short, that we should study well the climate, and mould our obsequious frames to the nature of the skies under which we sojourn." The above quotation I have made from the work of Dr. James Johnson—a gentleman to whom the Indian military surgeon is under a weight of obligation, which I regret to think that any one should be found unwilling to acknowledge, or disposed to return with any other than grateful feeling.

Effects of climate influenced by the degrees of civilization.

Although the physical effects of climate, in forming or influencing the differences by which

Influence of climate in forming the

existing varieties of the human race.

the varieties of tribes of the human species are characterised, such as stature, physiognomy, colour of skin and hair, or form of the skull, are foreign to the present inquiry, still, one cannot help remarking that, if the Bengallee is to be classed among the Caucasians,—the standard of the human race,—the effects of climate and locality must indeed be great and remarkable.

Necessity of observing all the effects of climate.

Although no climates exist that are uniformly hot and dry, hot and moist, cold and dry, or cold and moist ; yet, certain countries have such a preponderance of one or other of these qualities, as to give a very marked character to the physical and moral nature of man ; and physicians would do well to observe these results of climate more closely than has yet been done. “ *La science de l’homme a besoin d’une bonne géographie médicale.*”

The hot and dry season extends from the beginning of March to the middle of June, during which the winds are steady and strong from south and south-west. The temperature rises gradually from 80° to about 90°—95° in the shade, and reaches to 100°—110° in the open air. Notwithstanding the high temperature, this season is rendered far less oppressive to the feelings than might be supposed, by means of the moisture carried along with the monsoon in its passage over the bay, and likewise by the frequency of refreshing storms, accompanied by rain, lightning and thunder,

Effects of the hot season in Bengal.

The most ordinary and simple effects of the season just described, when “ the earth is iron

and the heavens brass,"—are, determination of the fluids generally, and of the blood to the surface of the body: it swells the flesh and produces that general chubbiness of appearance which is so remarkable in the torrid zone; it increases the animal heat, and acceleration of the pulse; it produces nervous excitability to a remarkable degree in some persons. Under exposure and neglect of temperance in diet, results ardent fever, with some serious local determination, and that very frequently to the cerebral organs, occasionally to the liver: but though this is admitted, under the measures of precaution dictated by common sense and experience, the very hottest are yet the very healthiest of our seasons; and of our stations also, which goes far to prove that it is not heat *alone* that does all the mischief, but something else that is superadded by the stranger European, and which is not in use, or practically known to the natives of the climate.

Keeping in view the following characteristics of a cold and temperate climate, viz. its low temperature, the alternations of seasons, the pureness of the atmosphere, the more nutritious, invigorating, and stimulating nature of the food, and the effects of warm clothing, and connecting these with the vascular plethora, the active functions of the brain, lungs, liver and kidneys of its inhabitants, the disturbances which will result when they are subjected to a continued high range of temperature, and to an atmosphere loaded with moisture, and frequently with vegeto-animal effluvia, may be anticipated. It is now

fully ascertained that the effects of a high range of temperature, and of moist miasmatic air, on the European constitution, are, a diminution of the changes effected by respiration on the blood, an increase of the excreting functions of the liver and skin, and a decrease of the urinary excretion. When, therefore, the plethoric European migrates to an intertropical country, the functions of the lungs and the pulmonary exhalation become diminished; the requisite changes are not effected on the blood, notwithstanding the excitement of the nervous and vascular systems by the increased temperature; and the already active and developed liver is irritated, and has its functions augmented by the increase of those elements in the blood, that the lungs and skin cannot remove from it.

Hence proceed febrile attacks, particularly when excited by their appropriate causes, inordinate activity with a relative frequency of the diseases of the liver; the secretion of acrid bile; and the disorder especially affecting the alimentary canal and excreting organs. The general adoption of too rich and nourishing foods and beverages by those who remove from cold to hot climates, tends greatly to increase these evils, as already explained; and the influence of high temperature and of a vertical sun upon the European head, is productive of disease both of it and of the liver. To these effects, the mental cultivation and activity of Europeans somewhat predispose them; whilst their heads are not so well guarded from external influences by the

constitution of its integuments and hair, and the thickness of the cranial bones, as those of the negro and mongrel varieties of our species. The obvious indications resulting from these facts are, that natives of cold countries migrating to warm climates should, particularly if the change has been made abruptly, live abstemiously and promote the functions of those organs which perform the most essential part in excreting effete or injurious elements from the circulation. The head should be kept cool, and protected from the rays of the sun ; the surface of the trunk and lower extremities ought to be preserved in a freely perspirable state so as to take off the load of circulation, and derive from the excited liver. In order to promote the secreting and depurating functions generally, active exercise, short of fatigue, should be taken, without exposure to the causes of disease, particularly those which are endemic. As the maladies which most frequently supervene on change from cold to a warm climate proceed neither from the increased temperature alone, nor from greater moisture of the air, but from these conjoined with malaria, and not unfrequently also with wide ranges of temperature during the twenty-four hours, especially in high and inland localities, with hot days, and cold, raw and dewy nights, and with a too full and exciting diet and regimen, causing fevers, dysentery and diseases of the biliary organs—care ought to be taken to avoid those causes, as well as whatever may tend to assist their operation on the frame, and to protect the system against the sudden changes by warm clothing at night.

Precautions
necessary to
guard against
the effects of
high tempera-
ture.

The consideration of the effects produced by migration, during a state of disease, from a cold to a warm and moist climate, is of the utmost importance. Keeping in mind its influence upon the healthy frame—chiefly in exciting the functions of the skin and liver, and diminishing those of the lungs—we are led to prescribe it in the treatment of various diseases.

Cases in which a high temperature is beneficial.

In hæmoptysis this change is obviously beneficial, especially as a warm and moist atmosphere, by this mode of operation, lessens the activity of the pulmonic circulation, and the disposition to sanguineous exudation from the surfaces of the bronchi ; bronchitis and tubercular phthisis are also often benefited, and the progress of the latter much delayed, by this change of atmosphere, especially when adopted early.

Chronic rheumatism is sometimes cured by this measure, seemingly owing to its influence in promoting the biliary and cutaneous functions.

Dropsies, particularly anasarca and hydrothorax, have been, in a few instances, removed by a change to a warm climate ; but whilst a moist state of the air is most serviceable in pulmonary and hæmorrhagic diseases, dry warmth seems more beneficial in dropsies, dyspeptic affections, and hypochondriasis, evidently from its effects in augmenting the insensible perspiration and the pulmonary exhalation, and imparting tone to the capillary circulation.

Besides these, gout in its early stages, *dysmenorrhœa* and *scrofula*, in nearly all its forms, are benefited by a change to a warm, or even a mild atmosphere.

The above extracts are from Dr. Copeland's recent work, wherein are to be found observations of great value on climate and endemic influences.

INFLUENCE OF A HIGH TEMPERATURE WITH MOISTURE.

"Of all the physical qualities of the air, humidity is the most injurious to human life."—CLARKE ON CLIMATE.

Although medical authorities have not been able accurately to estimate the effects of moisture either acting simply, or in combination with heat, yet it is certain that this last is more injurious than either applied separately. In warm and moist climates, obesity and laxity of frame are induced, a fact which was very early observed; thence the proverbial acuteness of the Athenians, and the sluggishness and stupidity of the Bœotians. The effect of situation upon the state of the habit may in some degree depend also on the gravity or weight of the atmosphere connected with locality. When the barometer is high, we feel vigorous and cheerful; when it sinks, languor and low spirits oppress us. "Accumulations of fat are said to take place in some animals in a few hours, in certain states of atmosphere. During a fog of 24 hours' continuance, thrushes, wheat-ears, ortalans, and red-breast are reported to become so fat that they are unable to fly from the sportsman."—*Bichat*.

Effects of
humidity with
heat.

During the first six weeks of the rainy season, the temperature falls considerably, accompanied by a freshness of the air delightful to the senses, after the previous excessive and dry heat. The monsoon is steady and veers to the south and south-east. Vegetation springs up with all the exuberance of a tropical climate, and the dust, so offensive at all other seasons, subsides, and is washed into the river.

From 15th of July to 15th October again, we live in an atmosphere having all the properties of a tainted vapour-bath ; and when the wind comes sifting through the Sunderbunds at south-east, we experience many of the inconveniences ascribed by Hennen to the Sirocco of the Mediterranean, which, *without affecting the thermometer or barometer in any sensible degree*, yet inflicts on persons exposed to it a feeling of indescribable languor and oppression, with an exhausting perspiration, much like what we suffer from in Bengal during the latter portion of the rainy season, and which a West Indian lady, speaking of the Sirocco, described as giving “ *the feel as if she had been bathing in a boiler of syrup.*”

Injurious effects of heat and moisture during the rainy season, and not to be ascertained by either thermometer or barometer.

At this season, through the saturation of the atmosphere, the perspiration by evaporation is suppressed, but that by transudation is enormously increased. If it be true that an individual in health ought to be in that state of perspiration in which it is insensible, what are we to think of the exhausting drain flowing from the pores of an European during this and the preceding season, though differing in their modes of action.

As in the Sirocco, the hair, during this season looks dank and greasy ; the scalp is covered with scales, and exudes an unpleasant acid odour : articles of ivory or common bone are covered with large drops. “ The walls of houses, stone floors, and pavements, says Dr. Hennen, invariably become moist, when the Sirocco blows. I have seen the stone floors at Corfu absolutely wet without any rain having fallen, and gentlemen who have made hygrometrical experiments, state to me, that the instrument has frequently fallen from ten to twenty degrees during the prevalence of this wind.” “ Wine bottled in a Sirocco is greatly injured, and often destroyed. Meat taints astonishingly soon during its prevalence. No prudent housekeeper ever salts meat at this time, for it either taints at once, not taking the salt, or else it keeps very badly. Drains emit more putrid smells in a Sirocco, than at any other period. No carpenter uses glue in the Sirocco, for it does not adhere. No painter willingly works during its prevalence, for his paint will not dry. Bakers diminish the quantity of their leaven during the Sirocco, as dough is found to ferment sufficiently without.—It is a remarkable fact that wounds and ulcers, and the discharge from mucuous surfaces generally deteriorate during the prevalence of the Sirocco, and it is equally certain, that if vaccination, or small pox inoculation are performed at this period, they are extremely liable to fail ; and if they succeed, the progress of the pustule is often suspended, and it is frequently ten or twenty days in reaching the state usually attained in six or eight.”

The Sirocco of the Mediterranean.

Many of the effects of Sirocco observable in Bengal.

The whole of the latter observations are annually verified in the surgical wards of the Native Hospital under my charge, and we have the same discomforts in perhaps a severer degree whenever a calm of any duration exists during the rains. I know nothing I should dread so much as a long calm at this season in Calcutta. It might not be followed by plague as in London, Nimeguen and Vienna, in former times; but in the result as affecting human life, I think we should not fare better than these cities.

Diseases of Europeans at this season.

Amongst Europeans, the diseases of the rainy season assume a character of diminished vital action; the ardent fever, with burning skin and racking head, of the hot season, degenerates into the congestive form, with moist or cool skin, oppressed pulse; and the complications are generally abdominal. Dysenteries also become frequent, implicating the whole of the abdominal organs.

Dr. Edwards on the effects of humid air.

Humid air, says Dr. Edwards, at an equal or even superior temperature produces a peculiar sensation of cold which differs, not in its intensity, but in its nature. It is more profoundly felt, and seems to penetrate the whole system, and particularly disposes to paleness and shivering. By these characters, I could not mistake a species of refrigeration, which consists in the diminution of the power of producing heat.

In dry air, on the contrary, a sensation is experienced, which is called a *sharp cold*, and which designates rather the nature than the

degree of the sensation, moreover, it is superficial, and when the reduction of temperature is not too great, an increase of activity is experienced ; the skin reddens ; and in extreme cases, the limbs have a tendency to stiffen, instead of yielding to their irregular and involuntary motions which constitute shivering. It may be seen by this comparison, and by what we have stated above, that damp cold must tend to produce in individuals whose power of developing heat is rather feeble, the series of actions which constitute the accession of an intermittent fever, especially if they are exposed to that influence during sleep. The confirmation of this will be found in the study of medical topography. In a great number of cases, these fevers are ascribed to marsh-miasmata in fine weather, but others occur in places and at seasons at which the atmospheric constitution which we have mentioned predominates.

THE COLD SEASON AND ITS EFFECTS.

I believe it was Charles the First who described the best climate, as that in which a man could bear exposure during the greatest number of hours at all seasons : according to this view, ours is assuredly one of the worst ; for, even during the cold weather, an European cannot be exposed for any length of time with impunity ; the hot sun and cold drying wind cause the most uncomfortable feelings of external dryness and internal fulness, unless it be under exercise sufficient to determine moisture to the surface. At the commencement of the cold season in

October, the temperature and the winds are variable ; the drying process is in full activity, and the unhealthiness is consequently great.

From the 1st November to 15th February, the weather is settled and agreeable to persons in health, the monsoon keeps steadily to the north-east, the atmosphere becomes dry, and a slight rise takes place in the barometer ; the thermometer ranging from 45° to 75°.

Effects of the
cold season in
Bengal.

During this season, the cold north-east wind absorbs moisture with extraordinary rapidity, from every object over which it passes. Furniture, although made of the most seasoned wood, foreign or native, warps and cracks audibly : plaster newly laid, falls from the wall from rapidity of evaporations : the old Indian becomes goose-skinned and shrivelled, with a sense of dryness in the palms of the hands, so uncomfortable as to give to some persons of irritable habit, and in whom the power of generating heat may be diminished by a long residence in India, a constant sense of nervous uneasiness of the whole surface, not to be described. "I can bear the chilling blasts of Caledonia," says a Scotchman, quoted by Ward, "but this—this cold, I know not what to do with it." The nights are damp during this season, as well as cold ; and the fogs which prevail are of a nature more dense than I have any where seen, except at Rangoon.

In old residents the appetite fails, accompanied by an oppressive sense of abdominal fulness ;

and where this state is not met by a suitable change of diet, clothing, and some medicine to act on the skin and bowels, visceral congestions, œdema of the lower extremities, or some more active disease may ensue. The most fatal forms of apoplexy that have come under my observation in Bengal, have occurred at this season. It is only to the sound of constitution, who are temperate in all ways, and thereby able to bear the cold bath, or such as are recently arrived from Europe, that our cold season is either agreeable or healthy. But here I would observe, that the degrees of health and disease are not to be measured by the thermometer: such observations in connection with health afford little information to the medical inquirer, and it has been well observed in our own country, that the influence of the weather on the human frame is not to be estimated merely by the thermometrical changes in the atmosphere.* An east wind, says the same authority, with the thermometer at 56° , will impress the body with a more chilling effect than a south-west wind, when that instrument indicates a temperature ten degrees lower; and a foggy atmosphere, in like manner, much more injuriously than a clear one of equal cold.

This season healthy and agreeable only to the sound of constitution.

The diseases prevalent at this season in Bengal are congestive fever of the continued form, intermittents, with their sequelæ, of tumid or indurated spleen; hepatic, and other forms of dysentery. The kidneys, in some persons, act during the continuance of the cold weather with diabetical violence, and only cease to do so on the return

Some of the diseases prevalent in the cold season.

* Dr. Bateman on the Diseases of London.

of a warmer season, and consequent equability of the circulation, causing moisture of the surface.

From the sketch now given of our locality and climate, it will be seen that, without taking the malarious influences into account, we are here exposed to atmospheric changes to an extraordinary degree: to an extreme of heat and dryness; extremes of heat and moisture; cold and moisture; cold and dryness. To specify all the effects, as far as they are known, of the above changes on health, would go much beyond the limits of these notes.

The European in Bengal may well join in the “complaint of the black knight” of Chaucer—

Nowe hote as fire, nowe colde as ashes ded ;
Nowe hote for colde, nowe colde for hete again ;
Nowe colde as yse ; and nowe as coles red,
For hete I brenne.

CURSORY REMARKS ON THE TREATMENT
OF ACUTE DYSENTERY OF EUROPEANS.

“In the treatment of no other disease, perhaps has the baneful influence of exclusive medical doctrine been more fully exerted than in that of Dysentery.”—COPELAND,

A memoir like the present is not consistent with any lengthened detail of the nature, causes and treatment of disease; but there are certain prominent features in tropical dysentery which, with reference to the great importance of the subject, require to be touched upon.

A lengthened detail of diseases not compatible with a report such as the present.

If dysentery were a disease of uniform character, and having an uniform *cause* and *seat*, then it might perhaps always be treated after an uniform plan; but a very slender experience of this disease, especially as it prevails within the tropics, or even within the British Islands, shews this not to be very generally the case: for although some portion of the larger bowel is universally implicated, yet, either from the first, or during the progress of the disease,—for we cannot often say which—the lesser bowel, the liver, the spleen, the pancreas and mesentery, become also the seats of morbid action, so as to modify the disease, and likewise its right treatment.

The dysentery of Bengal, like that of most other countries, a complicated disease.

In the dysentery of Ireland, Dr. O'Brien found “the liver diseased in one-half of the dissections, the spleen in one-fourth, the small intestines in two-thirds, and the colon and rectum in all.” It appears to me, that a want of

Necessity of attention to all the complications of disease before deducing a right treatment.

attention to these inevitable pathological conditions, has alone led to the system of exclusive treatment so much deprecated by the author quoted at the head of this article, and to the successive abandonment, by the surgeons of fleets and armies, of every exclusive plan hitherto proposed, almost as soon as it has been tried.

Catalogue-raisonné of the treatment of dysentery.

A catalogue-raisonné of the treatment of dysentery, at different times and places, will best illustrate this part of the subject ; and here is a short one :—

1629. Bontius, Physician General to the Dutch E. I. Company.

Bleeding—vomit of ipecacuanha and purge—the extract of saffron, “the anchor of hope”—fruit diet—emollient fomentations and enemata.

1768. Sir John Pringle, Army Surgeon.

Bleeding — vomiting — calomel purges—ipecacuanha and opium.

1768. Dr. Huck of the West Indies, Army Surgeon.

Bleeding — purgatives — tartar emetic—ipecacuanha in repeated small doses.

1782. Mr. Curtis of Madras, Naval Surgeon

Chiefly purgatives ; in the advanced stage—small doses of ipecacuanha powder—astringents, &c.

1787-9. Dr. Mosely of Jamaica, Army Surgeon.

Bleeding—antimonials — revulsion.

1791. Mr. Wade of Chunar, Army Surgeon.

Solution of tartar emetic and salts —anodyne and sudorific draughts.

1799. Sir Gilbert Blane, Naval Surgeon.

Blood-letting—vomit and purgative at the beginning; then ipecacuanha, opium and salts, followed by small doses of ipecacuanha.

1799. Lemprier of the West Indies, Army Surgeon.

Acute dysentery—vomiting—calomel purges and common purgatives, throughout the disease—warm bath and fomentation; chronic dysentery—calomel and ipecacuanha.

1799. Dr White, Naval Surgeon.

Extreme blood-letting—flannel roller—careful confinement to bed, the body being anointed with oil—no internal medicine.

1813. Dr. Jas. Johnson, Naval Surgeon.

Bleeding—mercury in full doses—sudorifics, with occasional mild purgatives and anodynes—strict attention to diet, clothing, &c.

1817. Dr. Robert Jackson.

During immersion in the warm bath, copious bleeding—"the sovereign remedy"—emetic of ipecacuanha and tartar emetic—mercury with mild purgatives—antimonials—charcoal, rhubarb and ipecacuanha in repeated doses—enemas of solution of acetate of lead and of charcoal.

1817. W. Fergusson, Inspector General of Hospitals, Dysentery of the Peninsular War.

Bleeding—small doses of calomel and ipecacuanha until the

gums become affected — inunction.

1818. Sir George Balingall, Army Surgeon.

Acute dysentery—topical bleeding — purgatives — sudorifics by infusion of ipecacuanha — opium — warm bath and fomentations — enemata — blisters : chronic dysentery — calomel and opium.

1818, 1822. The Dublin Physicians—Epidemic Dysentery.

Bleeding, general and local—calomel—antimony and opium combined—emetics—enemas—counter irritation—warm bath.

1819. Mr. Bamfield, Naval Surgeon.

Bleeding — cathartics — diaphoretics with mercurials.

1823. Dr. Latham, Milbank Penitentiary—Epidemic Dysentery.

After the failure of all the remedies common to European practice, including ipecacuanha, “calomel and opium became the settled practice.”

1828. Mr. Annesly of Madras, Army Surgeon.

Emetic of ipecacuanha, followed by full doses of calomel, smart purges, and warm bath—general and topical bleeding according to constitution and length of service in India—calomel and opium alternating with purgatives and enemas—ipecacuanha or antimony with opium, as a sudorific.

1832. Mr. Twining of Calcutta.

General and local blood-letting—simple ipecacuanha with extract of gentian—mild purgatives.

1832-3. Dr. J. Smith, Edinburgh.
—Epidemic Dysentery.

Scruple doses of calomel given short of salivation, “the more common measures having failed.”

1833. Dr. Jos. Brown.—Cyclopædia Practical Medicine.

Bleeding, general and local, repeated according to urgency and aided by hot bath and fomentation—gentle laxatives—mercury as a subsidiary to general and local bleeding, and combined with simple or compound ipecacuanha powder — sudorifics — opiates — enemas.

1835. Dr. Copeland.—Dictionary Practical Medicine.

Bleeding, general and local—mild aperients—cooling diaphoretics—opiates “after depletion”—blisters—ipecacuanha and opium.

Of the above list, the authors who speak most of their success are Bontius, Dr. Moseley of the West Indies, and Mr. Wade of Chunar; and on that account a brief inquiry into their respective modes of treatment may prove of some interest.

Authors who have been most confident in their specifics.

Bontius' treatment is already mentioned, with his extract of saffron, “than which (I dare to say) a more excellent remedy was never discovered by mankind; and I am fully persuaded

Bontius.

that it is the most perfect antidote against this disease, even when of a malignant kind." Dr. Moseley bled ; but the operation appeared to him secondary to other measures. "Bleeding," he says, "being an operation of great consequence in the flux, the cure is generally begun with it, repeating it as symptoms authorize, observing only '*non quæ ætas sit sed quæ vires sint.*' After bleeding, a vomit of ipecacuanha is to be given, and then an opiate after its operation is necessary. This is to be followed by a careful, continued course of them (antimonial wine and laudanum combined) to keep up a sweat in extent proportioned to the violence of the disease and not the trifling way of giving them in small doses, whilst the patient is exposed and their operation neglected." The Doctor goes on to relate that the eminent success of this plan was exhibited when the soldier had been suffering under "the worst condition of disease, with blood running from him, as in a hæmorrhage," and that before "several of the officers of different regiments in the West Indies, who were desirous to be spectators of a fact so interesting to the Army." He concludes this triumphant account by exclaiming—"such is the power of *revulsion.*"

The power of revulsion is no doubt great, whether effected by agents exhibited internally or externally. I remember, when in Ava, hearing of a British merchant, who being detained prisoner in Amerapooora under circumstances of barbarous severity, was seized with dysentery. After several days of unmitigated suffering, and

when death appeared to him near and certain, an order arrived for the removal of the prisoners, to a place of closer confinement, where they were literally packed together. This state, which at first appeared so dreadful, threw him into a violent *perspiration*, and from that moment all symptoms of disease left him.

Mr. Wade is still more to the satisfaction of such as would follow exclusive plans of treatment, for he claims a degree of success—a chain of success, unbroken except by “two cases of unfortunate termination in the treatment of about four hundred cases of fever and dysentery.”

Mr. Wade
of Chunar.

The treatment for both diseases was alike by solution of salts and tartar emetic, with anodyne and sudorific night draughts. Mr. Wade says, “that the medical world may draw their own comments on the cases which are submitted to their examination. The person who has treated and compiled them shall defer his, until the public may have formed some unbiassed opinion of them, he shall only venture at present to vouch for their authenticity.”

Now, this is just what has been done and claimed, by every mere writer of cases and pretender to extraordinary cures, from the dawn of medical science to the present day; and it is a curious fact, well deserving consideration how it happens, and happen it always does, that those who in their day claim the greatest and most exclusive success in the practice of medi-

Such authors
never consti-
tute a perma-
nent authority
in medicine.

cine, should, in after times, be the least followed in their modes of treatment.

Outline of the treatment of dysentery as common to the practitioners at the presidency.

It only remains to notice the prevailing treatment of the dysentery of Bengal, amongst the more experienced practitioners at the Presidency, and this I shall insert in the order of importance. Blood-letting, general and local, as first practically urged in the dysentery of India by Dr. James Johnson, takes the lead, and has done so for many years : it is the standard remedy ; and I believe that when the subject comes early and freely under this treatment, and that the case is not complicated with hepatic congestion or actual disease, little else than a few purges and sudorifics will be required for the cure ; but as in most cases of this formidable disease, as it appears within the tropics, the diseased state of the large intestines is essentially mixed up with general abdominal engorgement, other and important means immediately follow the bleeding ; and of the first are those which act powerfully on all the secreting organs, internal and external. Calomel in full doses with antimony, or with ipecacuanha, followed by purgatives, sudorifics, warm baths, enemas and other minor adjuvantia. I believe this to be the general course here, and I have seldom seen calomel carried the length of salivation, neither do I consider this degree of effect necessary to the cure.

Mr. Twining's mode of treatment by simple ipecacuanha.

The late Mr. Twining, in his excellent clinical work, advocates the use of simple ipecacuanha powder, combined with the bitter extracts, which plan he found to be very successful. I am not

aware that this system has been followed by any of the other practitioners of the General Hospital, where Mr. Twining officiated for several years ; neither am I able to state the extent to which the practice is successfully imitated in the provinces.

Ipecacuanha has been a favorite remedy in the south of India for upwards of forty years past. Dr. Whitelaw Ainslie, after an experience of thirty years, and an extensive practice amongst all classes of Europeans, says of this drug, that it "has no equal in simple dysentery, that is, dysentery not accompanied with hepatic derangement ; in such cases, given so as even to produce daily a little vomiting, it has the happiest effects." This is an observation of great practical importance, and, I think, impresses a just discrimination in the use of this valuable remedy. In speaking of an experience now of eighteen years, and an extensive range of observation of the disease as it occurs in hospitals and private practice in this city, also, as it appeared amongst the troops serving in the unhealthy provinces of Orissa and Gundwanah, and in the army at Rangoon, and Upper Ava, I should say with Dr. Ainslie, that it is alone in *simple uncomplicated* dysentery that ipecacuanha shows its best effects, administered as an *exclusive* remedy ; that is, after bleeding and moderate purging.

Dr. Whitelaw Ainslie on the treatment by ipecacuanha long a favorite plan in the South of India.

The author's experience of this plan.

In hepatic dysentery—no uncommon complication, especially during the cold season in Bengal, and it was very prevalent during

Hepatic dysentery.

the last one of 1835-6,—calomel is absolutely necessary to the cure. I lately treated for this form of the disease a gentleman who had suffered much from the Batavian fever contracted at the capture of Java: he was bled generally and by leeches, followed by purgatives and sudorifics; but no amendment took place, and nothing was voided but mucus and blood. Two full doses of calomel and antimony were then given, which produced copious biliary discharges and immediate relief: a few doses of blue pill, ipecacuanha and purgatives concluded the treatment.

There was in this case no enlargement of the liver, or uneasiness on pressure; but there was a total absence of biliary secretion; and until that was restored, the other treatment afforded no relief.* I believe that causes of this sort, treated without mercury (salivation is never proper or necessary) frequently terminate in hepatic congestion and chronic abscess.

Important considerations relative to the use of ipecacuanha.

When ipecacuanha is preferred, it is proper to ascertain the following circumstances:

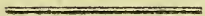
1st. Whether the bitter extracts have any and what effect in preventing vomiting under the use of this drug; for in extensive trials made by me, they have not appeared to have had any. It is true, that after a few days use, a comparative tolerance of the drug seems to be estab-

* Cases in point might be adduced in great numbers, but I am not partial to such evidences. Every practitioner must have seen effects similar to the above in some of the bowel disorders of infants.

lished, as in the case of the antimonial preparations; but this is altogether unconnected with the use or disuse of the bitter extracts.

2nd. Whether four grains occasion as much sickness as twelve; and if so, whether the larger dose should not be preferred in the cure of dysentery. If the action of ipecacuanha be purely revulsive, or, if according to Paris, it be to abate both the velocity and force of the heart's action, so as to affect "the whole series of blood vessels from their origin to their most minute ramifications," we should perhaps do wrong, in such a formidable disease as dysentery, to be sparing of our dose, if the stomach can be made to bear the larger quantity. The subject is important, and worthy of the further consideration of the profession.

Deserving the careful consideration of the profession.



CURSORY REMARKS ON THE REMITTENT FEVERS
OF EUROPEANS, AS CONNECTED WITH TOPOGRA-
PHY, AND WITH THEIR PREVALENT TREATMENT.

“The worst of all to strangers is the air.”

Old Writer on Calcutta.

Great differ-
ence between
the former fe-
vers of Cal-
cutta and those
of later times.

In noticing the more ordinary fevers of Calcutta, the first observations that force themselves are, their great differences as to intensity, in the present, as compared to former times; and secondly, the causes of this difference.

The earliest account we have of the state of public health in Calcutta is that already quoted from Captain Hamilton, wherein he mentions 460 burials out of 1200 British inhabitants from August till the ensuing January:—this was about the years 1710-15.

In Calcutta we have no longer such terrible epidemics as those of 1757, with its *cold stage of twelve hours*, and that of 1762, which carried off 50,000 Blacks and 800 Europeans. These seem to have in a great measure gone from us; and we happily find that here, as in the Western hemisphere, the malignant fevers of former days, if they have not entirely disappeared, are greatly mitigated. Even in Jamaica, although severe fevers sometime recur, they do not, as formerly, destroy “to the amount of the whole number of its white inhabitants once in five years.”

Stavorinus, speaking of the “sort of sickness or fever” which prevailed amongst the inhabi-

tants of Calcutta during his visits, (1768-71) says, that it “generally sweeps away those who are attacked by it in the space of three days.”

The accounts given by the old Indian medical and other writers would lead us to suppose the fevers of their times to have been of the malignant character of the *febres intermittentes algidæ*, described by Torti, in which the power of producing heat was so impaired that the patient died in the cold stage, at the end of two or three accessions.

Of Major Kilpatrick’s force of 240 men stationed at Fultah “not thirty of the whole detachment” (according to Mr. Ives) “were left alive between August and December, 1756, by one of these epidemics.” The same authority adds, that “the number of men buried in Bengal amounted to more than half of all who died in the several hospitals in India during the whole term of Admiral Watson’s command, a period of three years and one month.”

Dr. Bogue, who also served in Watson’s fleet, says that “out of three ships of the line and a twenty-gun ship, and those not fully manned, we lost in six months upwards of two hundred men, most of whom died of these fevers;”—so much worse was the climate of Calcutta in those times than that of any other port in our Eastern possessions.

The causes of the present difference in public health, from what it was formerly, must be of

The causes of the difference in public health.

the highest interest and importance, especially to communities living within the tropics; and with all the just confidence in modern medicine, guided by the lights of an improved physiology and those of pathology, I cannot yet agree with those who would ascribe the whole of the difference here spoken of, to superior modes of medical management, great as these confessedly are. It is not through the advantages of modern improvements in the treatment of mere disease, as contrasted with the more ancient modes, that public health has been so much amended, as through the great measures of *prevention of disease*, consequent on the progress of the public mind, and of Governments, in *general knowledge*, leading directly to improved habits of life* in communities, improved localities, institutions of police, &c. :† it is to these that the advancement of public health is most indebted, and that it will continue to be so, although the circumstances are not sufficiently weighed by some of us, when, in our hurry to praise ourselves, we forget what is due to our predecessors, and that these last had frequently to treat a form of disease which we have never seen, and with whose fatal severity we are, consequently, unacquainted.

Consideration of the difference in disease necessary, ere we venture to censure those who have gone before us.

This much I think due to the older practitioners of Calcutta, some of whom were evidently men of talent and correct observation.

* Vide Appendix No. 1.

† The malignant agues spoken of by all the older English physicians seem entirely to have given way to measures of municipal and other improvement; and the most unhealthy seasons in modern times are actually productive of less disease than the most healthy seasons were a hundred years ago—so much for the advantages of preventive measures.

I am satisfied we are never so wrong—perhaps we are seldom so ignorant of the truth and of circumstances—as when we indiscriminately censure those who have gone before us, and who, as in the case of Calcutta, had to treat a fever with the very type and aspect of which, as I have observed, we are at present unacquainted. It should not be said of us that we are only able to see the defects of the older writers by the lights which they have afforded us. Dr. Southwood Smith, himself one of the most able writers on fever of this or any other age, has the following observation on this head—“It is remarkable how entirely the most distinguished physicians of all ages, who have treated of this subject” (fever) “coincide in the feeling, that with regard to this important class of disease, it is impossible, in the short life allotted to the most aged, to do anything more than add a little knowledge to the common stock.” If this be true,—and who that knows anything of medicine can doubt it,—we need be in no haste to praise ourselves, and we should be slow to censure others.

It was here, as in the Peninsula, according to the admirable sketch of Sir James Macgrigor, “not only had fever very different forms in different seasons and in different quarters of the same seasons, but they required very different, nay opposite kinds of practices, the knowledge of this strongly impresses on us the necessity of becoming acquainted with every attending circumstance before we venture to censure any particular practice.”

This subject
illustrated from
the writings of
Sir James
Macgrigor.

And from
those of a ce-
lebrated critic.

The conduct here recommended, on such distinguished authority, is peculiarly befitting our profession, and we should follow it, if we would escape the censure bestowed by a celebrated critic on certain politicians, who when mounted on the shoulders of their fathers cry out “how much taller I am than papa.” “Such a person can never want matter for pride if he find it so easily. He may boast of an indisputable superiority to all the greatest men of all past ages. He can read and write. Homer did not know a letter. He has been taught that the earth goes round the sun. Archimedes held that the sun went round the earth. He is aware that there is a place called New Holland, Columbus and Gama went to their graves in ignorance of the fact. He has heard of the Georgium Sidus, Newton was ignorant of the existence of such a planet. He is acquainted with the use of gunpowder, Hannibal and Cæsar won their victories with sword and spear. We submit however, adds the same distinguished writer, that this is not the way in which men are to be estimated.”

* * * * *

The same
authority con-
tinued.

“Sydenham first discovered that the cool regimen succeeded best in cases of small pox. By this discovery he saved the lives of hundreds of thousands, and we venerate his memory for it, though he never heard of inoculation. Lady Mary Montague brought inoculation into use; and we respect her for it, though she never heard of vaccination. Jenner introduced vaccination; we admire him for it, although some still safer and more agreeable preservative should be discovered. It is thus that we ought

to judge of the events and the men of other times. They were behind us. It could not be otherwise."

If we would desire a further lesson of professional moderation let us take it from Hennen, who, in speaking of the severer remittent fevers of the Mediterranean, makes the following remarkable observation:—

Dr. Hennen's remarkable opinion on the fevers of the Mediterranean.

"I have not had access to the returns of the French and Russian Army, but I have been made acquainted with the general result, which speaks strongly in favor of those medical philosophers, who assume that on an average of years, mortality by fever is nearly the same whatever the mode of treatment adopted may be. For I have every reason to suppose, that among the French troops, where the "medicine expectante" was generally the order of the day, there occurred, upon the whole, no greater proportion of deaths than among the English, who met the fevers of the country with mercury and the lancet in all the activity, and all the orthodoxy of the schools. And among the Russians whose practice was as rude and barbarous, and their apathy, as to the event, as impenetrable as that of their Turkish neighbours, the results were similar." Now, if these had been the observations of an ignorant or desponding physician, I should consider them unworthy of notice; but who is there that recollects the talents, energy and moral courage, together with the experience of Dr. Hennen, who will not read in these remarks a lesson of moderation.

It was not that Dr. Hennen despised the means, or that he considered it indifferent which was chosen; for in his own experience he well knew how to practise with energy and effect: it was that, in all his writings he viewed boasting as something worse than bad taste. Had Mr. Wade, in his *four hundred cases*, shewn more of this candid spirit, and more also of Dr. Hennen's other qualities, they would have been longer remembered, and his wonderful cures might have been some example to us.

As far as I can learn, the fevers of this place have for a length of time been treated according to the symptoms, and not by any exclusive plan: bleeding has been had recourse to, to moderate the force and frequency of arterial action, and to relieve complications; free purgation, by means of mercurials conjoined with brisk cathartics, to remove accumulations or vitiated secretions, and to aid in correcting the latter; mercury, with sudorifics to equalize the circulation, and to act on all the secretions and excretions; bark or quinine, during the remissions, and to arrest the coming paroxysm, &c. &c.—these seem to have been long in use.

Blood-letting the standard remedy.

If tropical fever and dysentery were always simple morbid actions, no doubt, as recommended by some, bleeding and purging might in general prove adequate to the cure; but unfortunately in both cases, we seldom find this unmixed condition to hold in actual practice in Bengal, where we have in our fevers continually to combat abdominal complications, with

the addition in the hot season of the cerebro-spinal—all demanding a more or less complex and careful treatment—a speedy unlocking of all the secretions and excretions, which the most ample experience proves that bleeding and purging *alone* will not effect. Yet bleeding, here as in dysentery, is the standard remedy, subject to age, constitution and length of residence in India. It precedes all other management in the order of time, and in point of importance. I believe this to be the general view of it taken by the practitioners of this city; and it is but common justice to say that the value of this most powerful of all means was first emphatically urged on the Indian Surgeon by Dr. James Johnson. It is to him we owe that blood-letting has become a systematic part of our treatment. Of the several valuable authors besides, who have since followed him, and helped to fix the professional attention, I need say nothing.

First im-
pressed on the
Indian practi-
tioner by Dr.
Jas. Johnson.

Subject only to the limitations already stated, bleeding—early and copious bleeding, and practised at the very onset of the stage of reaction—is always necessary in the severer forms of Bengal remittent fever; then, full doses of calomel with sudorifics, short of producing salivation, with saline purgatives in the intervals. If the disease does not now yield, but on the contrary if the paroxysms recur at shorter intervals, and with increased severity, leaving but imperfect remissions—then, there is imminent danger, and inflammation, or acute congestion in some important abdominal or other organ, may be more

Copious
bleeding al-
ways necessa-
ry in the se-
verer fever of
Bengal.

than suspected. For this, in addition to topical bleeding and cold to the head, when the seat of disease, mercury in small repeated doses, with antimonials, must be given so as mildly to affect the system: it is the only known means of saving the patient, by anticipating the destruction of some organ essential to life: it here becomes, in the apt words of Dr. Robert Jackson, a remedy of necessity.

Administra-
tion of quinine.

Where the remissions, on the other hand, are well marked, quinine should be given in full doses, without waiting for every thing. Some practitioners recommend that before this drug is used, we obtain previously a clean tongue, natural secretions, and the absence of all heat of skin or local affection. I believe this to be a dangerous practice: if we are to wait for every thing, we shall often wait too long, or till it is too late. I have always administered quinine in the more favourable cases now stated, in disregard of certain local abdominal affections (those of the head should in general exclude it) believing, that if I arrest the paroxysm, I do greatly more good to the system at large, than quinine can possibly do of harm to the local affection—the treatment of which by local depletion, &c. is not interfered with by this means: again, all tenderness on pressure, or local pain, does not, in the case here stated, necessarily constitute inflammation.

In these more favourable cases, it rarely happens that topical bleeding, purgatives, and mild mercurials, &c. with quinine during the remis-

sions, fail in conducting the patient to safety, the general measures already stated, having been premised. I have also seldom had occasion to urge mercury to the degree of salivation, during the whole period of my service in India.

Almost all our complications in the fevers of Bengal are abdominal, whether these be of an inflammatory nature, congestive, or of mere irritation; and this would seem to be the cause of the apparent prostration, with tendency to collapse, so common especially during the rainy season with us; for, even within a few hours, as contrasted with similar affections of the head and chest, there exists here an oppression, alarming to the stranger physician.

Complications in Bengal generally abdominal.

The prostration produced by a violent blow on the abdomen more nearly resembles the febrile collapse than any other morbid condition I am acquainted with; it is probable that both depend on the disturbed function of the great sympathetic—the powerful though silent source of many symptoms known to us only by their effects.

This tendency to sinking is the reason why our measures of cure must be so guarded as to the time of using them; for there is no country in the fevers of which more regard must be paid to the stage of disease for applying remedies—especially blood-letting, than in those of Bengal: what was a saving means at the commencement

Caution as to the right time for remedies.

of the paroxysm of remittent, is as surely destructive at the end of it. Dr. Robert Jackson's earliest works even, abound in valuable injunctions on this head, and such as ought to be present to the recollection of every man who treats fever. After some admirable rules as to the "just point of time" for using the more powerful remedies, and especially blood-letting, he concludes that "the same remedy, after the delay of a few hours, not only ceases to be useful, but the application of it even sometimes becomes unsafe:" further he adds with truth that, "it requires much discernment in many cases to discover the cause, a very correct judgment to measure the means, and even no small degree of knowledge to be able to ascertain that the end is attained."

Importance
of the manage-
ment of con-
valescence.

I cannot conclude these cursory remarks without adverting to the importance of the management of convalescence from fever—not the least serious of the duties imposed on the Indian physician. In all cases of recovery from fever, but especially in those wherein the complications have been severe; that is, when important organs have been affected in the course of the fever, or as a sequel to it, it is impossible to be too careful in the diet, and in attention to the nature and activity of the secretions; and this vigilance must not be relaxed until perfect health is re-established. How often do we see patients who have been well enough treated during the acute disease, but on whom the neglect of this rule of practice entails enlargement of the liver or spleen, or other visceral engorge-

ments, requiring a protracted sea voyage, or even a return to Europe at great inconvenience. This is a subject that should always be present to the mind of those who have the management of Military Hospitals, wherein the perfect re-establishment of the soldier's health, before his return to barracks, should be a maxim never to be swerved from.

This is not the place for reviewing medical books, or laying down general rules of practice; but it cannot be too much, or too often impressed on the Indian Surgeon, that it is on his careful attention to the phenomena of fever that nine-tenths of his usefulness depend.

I have here attempted an outline of the treatment of the endemic fever of Calcutta, and of Bengal generally: it will be found to correspond in principle with that of the endemic fevers—the bilious remittents of the world—whether east or west: they are all fevers of locality, and do not by any means differ so much as medical writers of partial views and partial experience would have us believe:—their supposed differences, or nosological divisions, are more frequently the work of man than of nature; they may, and do differ in degree of intensity; but their essential phenomena, and the organs affected in their progress, so as to endanger, or ultimately destroy life, are the same; and so likewise are the essential parts of their treatment.

Conclusion.

As in the case of dysentery, it may prove useful to take a glance at the prominent portions

of the treatment of fever by the following authors, in the order of dates.

- 1629 Bontius.—Purging—bleeding, general and topical, repeated as occasion requires—opiates—extract of saffron, &c.
- 1751 Cleghorn.—Bleeding, repeated according to occasion—cathartics—bark.
- 1757 Dr. Bogue, formerly of Bengal.—Bleeding—emetics—purgatives—mercury—bark—camphor in the cold stage.
- 1757 Huxham.—Bleeding—purgatives—diluents.
- 1768 Pringle.—Bleeding repeated according to occasion—active purges—antimonials—bark, occasionally.
- 1790 Balfour.—Vomits—calomel and purgatives, frequently repeated—bark and opium.
- 1794 Shanon.—Emetics—purgatives—sudorifics—bark—opiates.
- 1795 Chisholm.—Calomel and opium, to salivation.
- 1797 Clark.—Mercurial purgatives—bark—anodynes.
- 1799 Blane.—Bleeding—vomiting and purging—sudorifics—bark—anodynes.
- 1803 Dr. Robert Jackson.—Extreme bleeding, and practised always in the recumbent posture—emetics and purgatives—cold bath—mercury only as a “remedy of necessity”—change of air.
- 1807 Curtis.—Evacuants—diluents.
- 1808 Lind.—Cautious bleeding—vomiting—purging—antimonials—bark.

- 1810 W. Fergusson, Inspector General.—Early and copious bleeding—mercury to affect the system—sudorifics—purgatives.
- 1811 Bancroft.—Bleeding—cold affusion—calomel purgatives—bark.
- 1813 Dr. James Johnson.—Bleeding, general and local—calomel with purgatives—mercurial treatment, according to severity of disease—diaphoretics.
- 1816 Burnet.—Bleeding, general and topical, according to occasion—purgatives.
- 1818 Ballingall.—Blood-letting, general and local—purgatives—cold affusion—moderate use of mercury—occasional emetics, and the use of bark.
- 1819 Dickenson.—Vomits — bleeding — active purging—cold ablution—diluent.
- 1827 Geddes.—Blood-letting — mercurial and other purgatives — antimonials — diluents — opiates before the paroxysms — quinine.
- 1828 Annesley.—Blood-letting, general and local—emetics—full doses of calomel—purgatives—diaphoretics—cold affusion and cold applications to the head—enemas—bark, during the remission.
- 1832 Mr. Twining.—Bleeding, general and local—two or three full doses of calomel, followed by active purgatives—mercury so as to affect the system “in some cases”—quinine during the remissions.
- 1833 Dr. Joseph Brown, Cyclopædia of Practical Medicine.—Bleeding, general and local, aided by the warm bath—mercurial

purgatives—cold affusion—cold to the head—acidulated cold drinks. In the advanced stage, opium—change of air.

1835 Dr. Copeland, Dictionary Practical Medicine.—An emetic—blood-letting, general and local—“full doses of calomel followed by purgatives”—evaporating lotions to the head—cooling diaphoretics—enemas—quinine, during the remission.

Statistics of
Fever in differ-
ent quarters of
the world.

It may now prove interesting to observe the effects of fever and dysentery on the health of European Soldiers in the East and West Indies, as contrasted with some of the European stations, &c.: the following is given by the Deputy Inspector General Marshall, from the records of the Army Medical Board:

“Out of every thousand men in the following stations, the annual ratio of mortality is as under stated, and by the following classes of diseases:

DISEASES.	Windward and Leeward Island.	Bengal.	Madras.	Bombay.	Gibraltar.	Scotland.	Jamaica.	Ireland.
Fever,	37...9	16...3	11...0	15...0	2...4	2...3	112...5	
Diseases of the	18...8	20...4	20...5	16...1	1...8	0...2	4...2	
Bowel, }								
Liver, ...	1...8	4...0	5...0	5...0	0...2	0...2	0...5	
Lungs, ...	10...3	2...3	2...3	2...4	5...8	4...6	7...4	
Head, ...	3...1	2...0	0...6	1...2	0...2	0...2	1...6	
Cholera,	0...0	14...2	8...0	10...3	0...0	0...0	0...0	
Dropsy,	2...0	0...5	0...7	0...7	0...3	0...8	1...0	
Other Diseases,...	6...3	3...1	3...9	4...1	2...9	2...7	3...8	
Annual Mortality,	80...2	63...0	52...0	54...8	13...6	11...0	131...0	15...0

NOTE ON THE TREATMENT OF THE CHRONIC LIVER
ENLARGEMENT.

This disease is by no means uncommon in Bengal, as a sequel to fevers both remittent and intermittent. The function of the organ is greatly impaired; there is frequently a hacking dry cough—dyspepsia in various forms, and general ill health, with a sallow pasty complexion and emaciation. The treatment of this disease is not well understood. Mercury I believe to be injurious: it injures the stomach and bowels—already over drugged, without exciting any secretion from the organ chiefly affected, and on which mercury, from repeated use, has lost its effect:—purgatives of an irritating or drastic nature are equally injurious; in fact, it is often an unmanageable disease, not readily amenable to treatment or change of climate.

This disease
not uncommon
in Bengal.

Mercury gene-
rally injuri-
ous.

The plan of treatment I have generally had recourse to in such cases is the nitro-muriatic acid bath, steadily persisted in for a month or six weeks at a time: it seems, like mercury, to act powerfully on all the secretions, and in the cases here spoken of, I do not know a better remedy. When from morbid dryness of the skin, the absorbents will not readily take up the acid, I direct the occasional use of the vapour, or warm water bath, with powerful friction of the whole surface, in order to stimulate and purify the skin.

Plan gene-
rally adopted
by the Author.

Out of many cases that I have treated with advantage after this manner, I will only parti-

A severe case, given in the patient's own words—reason why this mode is preferred.

cularise the following: it was that of a gentleman in the civil service. The details are in his words; and when the patient is a person of education, I conceive this to be in all cases the preferable mode of describing a case, because we daily observe that “such is the nature of the human mind that cases *for* a preconceived opinion are retained” (and related too) “easier than those *against* it.” (*Gooch.*) Were the example of Sir A. Cooper and others followed in this particular, medical cases would stand better with the profession as authentic evidence. “In November 1829, I arrived in Calcutta, suffering from the consequences of a jungle fever contracted at Chittagong. My liver and spleen were perceptibly enlarged, and my limbs were much swollen and so stiff, that I could with difficulty walk, and the least exercise occasioned vomiting. Before my arrival at the presidency, I had for months taken medicine—this plan was altered, and I was put through a course of the nitric acid bath, taking a vapour bath every other day. The nitric acid bath acted in a few days very powerfully immediately on using it, and in about three weeks both the liver and spleen could no longer be felt, nor did pressure give me much uneasiness: the stiffness too disappeared, and my skin became less dry and tense. I took an aperient draught once or twice a week, and nothing else but the bath. I left Calcutta towards the end of December for Simlah, and had little or no occasion for medicine for two years afterwards, my general health being completely restored.” I shall add nothing to the above case, beyond remarking that it was

one of the worst I have seen. There was general anasarca from visceral enlargement, and altogether, the danger appeared imminent. The result was as stated; and I am disposed to think after an extensive trial of it, that the nitro-muriatic acid bath is not used so often here as it deserves, in these chronic cases, and that when had recourse to, it is often abandoned without just reason, and fails only from the imperfect or desultory mode of using it. When I prescribe this remedy, I put the following directions in the patient's hands, and I have seen it reduce enlargements both of liver and spleen when other treatment had, as in the above case, utterly failed of doing any good. Cases will occur, however, where the bath proves useless, and that I believe to arise from general debility, or a consequent inaptitude of the absorbents in particular. The natives seem aware of the beneficial effects of acid treatment for the common tumid spleen, for which their doctors prescribe the undiluted sulphuric acid, in doses of one drop given inside a piece of plantain, or more generally, five drops in some cold water morning and evening.

Mode of preparing and using the nitro-muriatic acid bath.

Another plan of treatment is by a mixture of aloes, vinegar and garlic, with a small portion of the bazar sulphate of iron (Kusees): the latter is said to be very successful.

The proportions of acid I use, are as follows, viz.

- Muriatic acid..... 3 oz.
- Nitric..... 2 oz.
- Water 5 oz.

Directions for preparing and using the nitro-muriatic acid bath.

Directions.

1st. Two gallons of water (about ten bottlesful) may suffice for a bath.

2nd. To each gallon of water add 3 oz. of the dilute nitro-muriatic acid by measure.

3rd. The bath thus prepared will keep in use for three days, by adding half an ounce of the dilute acid and a pint of water, morning and evening, in order to make up for the waste by evaporation.

4th. A portion only of the bath to be heated for use, after which it is to be added to the remainder, so as to make the whole of a comfortable warmth.

5th. Let both feet be placed in the bath, while the inside of the legs and thighs, the right side (over the liver) and the inside of both arms are sponged alternately: this should be continued ten or fifteen minutes morning and evening.

6th. While using the bath, a gentle aperient, such as Cheltenham salts, or Epsom salts in some bitter infusion, should be taken every other morning.

7th. Earthen or wooden vessels should be preferred as foot-baths, and all the sponges and towels to be kept in cold water, as the acid corrodes them.

PREVENTION OF DISEASE.

On the important matter of prophylaxis, nothing new can be urged, as the chief means of prevention of disease are present to the common sense of most nations to a certain degree, if they only chose to act upon them. But there is one circumstance which ought to be impressed on the public, and it is, that however useful medicine may be in moderate and judicious doses, under ordinary circumstances of season, or during epidemics, it is yet more on the proper selection of localities, the avoidance of day and night exposure, and care in diet, exercise, clothing, &c. that disease is to be prevented, and not by a system of continued self-quackery, such as many persons pursue in this country, to their great injury.

Nothing new
to be said on
this head.

Health not to
be maintained
by drugging.

Many is the strong habit I have seen impaired by this senseless custom; and I have known several lives put in jeopardy by taking saline purgatives during seasons of cholera.

Self-drugging
injurious in
India.

The admirable rules prescribed by Johnson regarding dress, food, drink, exercise, sleep, bathing, &c. &c., and the regulation of the passions, are well known; but perhaps better known than regarded: they are like the vital points in religion and morals: all men agree in them; yet how easily are they forgotten. In order to think seriously on health, most men require to suffer from disease first: the lessons derived from such experience are longest remembered.

Admirable
rules of Dr.
Johnson.

Most diseases contracted during the night. The reason as given by Dr. Edwards.

It is a remarkable fact, and one often observed, that most diseases in malarious countries especially, and where vicissitudes are great, have their origin in *night* exposure; but I believe the reason has only lately been rightly explained by Dr. W. F. Edwards. During natural sleep, he says, there is a diminution in the power of producing heat, and this explains why a damp cold air, or a dry and piercing air, which is borne without inconvenience while the individual is awake, even without the aid of exercise, may be hurtful during sleep. It may, in addition, be remarked that the effect of exposure to cold during sleep, must necessarily vary according to the power of producing heat. As a means of guarding the system against the effects of atmospheric vicissitudes, I know of none more influential than the cold bath, provided always that the subject be temperate in habits, and healthy.

The subject of practice as applied to troops; Dr. Hennen's views.

On this subject, as applied to troops, I cannot do better than quote the sensible observations of Dr. Hennen, who speaking of the value of medicines, says, he does not question their proper use in the cases of reflecting individuals; "but I do not hesitate to say, first, that they cannot be generally applicable to a *whole* corps or garrison. Secondly, that although the soldier may submit in passive obedience, he will invariably make himself amends (as he supposes) for the restriction, by subsequent excess of one kind or other; and thirdly, although Military officers are sufficiently enamoured of any favorite theory originating with themselves, they

view the proposals of medical men but too often with a jealous eye, especially when the advantages to be derived from them are merely prospective. We possess the power, by means of the established medical inspections, to meet the approaching disease as early as possible, but I question the prudence, (in a Military point of view) of anticipating it before its arrival by the general administration of medicine throughout the garrison ; because, nearly thirty years experience has convinced me that no power on earth will reconcile British soldiers to taking physic en masse, when they are not sick, nor will they ever view the man who orders it in any other light than that of a speculative experimentalist. The true preventives to disease are shelter from the heat of the day and from the dews and cold of night, avoiding the neighbourhood of marshes and other unhealthy spots in Military exercises, mounting guards at such an hour that the least possible number of fatigue parties may be employed in conveying dinners, &c., timing duties in such a way that the men may enjoy their natural sleep, regulating the messes so that the soldier shall always have a due proportion of vegetables, and especially a comfortable breakfast before going on duty in the mornings ; furnishing every man with flannel waistcoats or cotton shirts,* enforcing personal cleanliness by frequent bathing, and by daily washing the feet, &c., but, above all, regulating the canteen, so that access can be had to liquor only in the evening,

* During the rainy season in Bengal, the suit should be changed after exercise, or whenever saturated with perspiration ; and friction with a dry cloth used at the time of changing.

and then taking every precaution that the bad spirits and sour wine of the country be rigidly withheld. We may refine as much as we choose, and we may modify our plans according to circumstances with critical precision, but these are the basis upon which health is founded so far as the soldier is individually concerned."

Dr. William
Ferguson on
the use of flannel.

The furnishing every man with a flannel waistcoat, as recommended by Hennen, is still a debatable point with Military surgeons; and as far as my experience of Military service goes, I must altogether agree to the judgment of the distinguished Dr. Wm. Ferguson, an officer whose retirement from active duty in the field is yet devoted to the good of the soldier. "I for one," he says, "protest against it, (the flannel) as an enervating habit, of which the healthy, hardy soldier (and there ought to be no others in the army) can never stand in need. To the feeble and valetudinary it is most useful, and as an hospital indulgence highly proper, but when worn in the crowded barrack-room, with too often bad washing, and insufficient change, it becomes a deposit of filth, even of contagion, irritating to the skin and incompatible with health and cleanliness. No one can doubt of its being one of the best preservers against camp diseases, and while it serves so good a purpose to the soldier in the bivouac, its disgusting nastiness, as he wears it, may be tolerated; but with the above exception, it never should be seen either in his barracks or quarters."

Dr. Ferguson is deserving our attention on another point of even greater importance than the last. He says "the night covering and accommodation of the soldier still call for the medical comment, and here I shall take the liberty of quoting from myself, being an extract from one of the West India reports to which I have referred in my former letters. Under the head of clothing, it may not be improper to consider the night as well as the day covering of the soldier, and on this point an improvement has been introduced into West India service, of which I would earnestly recommend the adoption throughout all the quarters of the British army in every part of the empire. The most decent and healthy regulation of making soldiers sleep in separate hammocks, has every thing to recommend it, without any disadvantages that I am aware of.

Dr. William Ferguson on the night covering of the soldiers.

The hammock is portable, cool, soft and elastic, can be washed like a garment, while it cannot be used, without raising the body off the ground, or the hard boards, and it requires no aid from flocks or straw to make its inhabitants comfortable, an additional blanket in a cold climate being all that is necessary. The barrack beds, where the soldiers formerly lay and lie now in Europe crowded together, are as indecent as they must be uncomfortable and expensive. The fixture sleeping berths occupy no small portion of the interior of the barrack-room, and greatly obstruct the ventilation. The straw palliasses, on which two or more sleep, are often but an inadequate protection against the hard boards beneath; and if not frequently changed, may

become foul and infectious, all of which may be obviated by the erection of hammock railings by means of which the soldier would be raised off the ground, thereby preserving a degree of ventilation in the apartment even during the night, and most certainly ensuring it in perfection, as soon as the soldier is up for the whole of the day. To this I have only to add, that wherever a couple of stakes can be driven into the ground, it will serve all the above-mentioned purposes in the bivouac. The erection of hammock railings, consisting of uprights with cross posts and hooks, would be as simple as it is economical."—(*U. S. Journal.*)

ON THE EFFECTS OF CHANGE OF LOCALITY ON
SICK AND CONVALESCENTS.

This subject has not met with the attention it deserves, from writers on the diseases of warm climates especially, but it is one of high importance, and proper to the objects of this memoir.

The subject of great importance, but not sufficiently attended to by the profession.

He who has witnessed the surprising effects of change of locality on the sick of an army in full march, and that frequently under disadvantages as to ease and comfort, which would lead the inexperienced to form the most gloomy prognostics, will agree with me in viewing change of locality as tantamount to a transition from almost hopeless disease to rapid recovery, in many forms of protracted fever, and other disorders.

When we see the patient worn out from recurrences of fever, and the treatment directed to its removal, yet suffering a daily or other periodical accession, amounting in the latter stages only to dryness and slight warmth of skin, followed by restless nights, then it is that the immediate and astonishing effects of change are shewn; and how many a poor soldier dies annually throughout the crowded hospitals of India for the want of it; indeed, I might add that many a patient in civil life is allowed to die in our ports, that might be saved by a timely removal to sea or other situation.

Occasions when change is most beneficial.

Johnson, speaking of sufferers from repeated tropical dysentery, says, they “waste away and die for want of the only remedy that possibly

Dr. Robert Jackson the best authority on this head.

could arrest the hand of death—change of climate.” Dr. Robert Jackson, in his work on the medical department of the British army, speaks of it as “proved incontestably in a multitude of instances, that the act of travelling in the open air, is a powerful remedy in some of the least manageable cases of fever. * * * *” It is not indeed, found in the catalogue of remedies mentioned by medical writers.”

Danger from this plan altogether visionary.

Some practitioners entertain a dread which I believe to be altogether visionary of the “danger” attending a removal of the patient, in what they call, his exhausted condition, and continue the routine of drugs until both the patient and their remedies are in reality exhausted. Here, again, I must beg to quote Dr. Jackson, whom I believe to be seldom equalled as an authority on matters connected with the medical management of troops. Speaking of his experience in America and the West Indies as surgeon to the 71st Regiment, he says—“It is safe in the late periods of fever, and few cases occur where apparent weakness forbids its use if it be conducted with caution: nay, many cases have happened in the author’s experience when the functions of life, from a state of apparent stagnation, have been speedily and effectually restored to alacrity, by the use of this means alone.”

Condition of the army of Rangoon.

Those who marched with the miserable remnant of the army, from Rangoon to upper Ava, will never forget the drooping form and haggard eye of the European soldiers on the day we broke

ground, and the condition of the same men on entering Prome, two months afterwards.

It is true, there were many circumstances in operation in this case that are not usual; but there were, on the other hand, many common to all such occasions. On quitting Rangoon, we left all our misfortunes behind us, along with the four thousand and some odd hundreds, whom want and misery of every kind had buried there:* while before us were changes of every kind, *without a possibility of reducing our condition to worse*: there was change to a pure atmosphere, from the marshy tainted burying-ground that we had occupied for so many months—improved diet and wholesome exercise—hope, “the first of the mental tonics,” with “its kind cheat and fair fallacy,” that makes us believe—

Remarkable
improvement
on quitting it.

“We are not where or what we be,
“But what and where we would be;”

in short, it was Phillip le Hardi with the wreck of his army quitting Tunis: every thing for which a man lives, we thought before us, while all for which he dies, we knew we had left behind us.

Even in that terrible disease, ophthalmia, which one would think the least amenable to

Influence
of change of
place in oph-
thalmia.

* “The deaths in the 89th Regiment,” says Mr. Walsh, “sometimes averaged 100 per week—a number exceeded in other corps. The aggregate deaths during the first three months, exclusive of casualties in action, must have amounted to upwards of three thousand Europeans or more than one half of the force originally dispatched.” It was not climate that occasioned this wreck;—indeed it was one of the least of the causes.

Dr. Vetch on
this subject.

such influences, the effects of change are most remarkable. Dr. Vetch, speaking on this subject, observes, that even when the second stage has commenced, he has "never seen any other than the best effects to attend a change of place. Soldiers who have commenced a march with this disease completely formed, though exposed to heat, dust and fatigue, and not abstaining even from intoxication, are invariably better at the end of the journey than when they set out."

Mr. Geddes.

The 2nd Battalion 14th N. I., says Mr. Geddes, left Jaulnah with about 500 sick in hospital from fever; by the time of their arrival at Vellore nearly the whole of these had perfectly recovered.

Dr. George
Gregory.

I will add one more quotation in support of my opinion as to the great importance of this subject, from one of the ablest writers of the day on elementary medicine. Dr. George Gregory, speaking of the general effects of change of air, says, "where the circumstances of the patient admit of it, this last resource of medicine should never be neglected. It seems to act as a general tonic, invigorating the whole frame, improving the quality of the blood, and stimulating every organ to a more healthy performance of its office."

ON THE CHOICE OF LOCALITIES FOR THE SICK OF
CALCUTTA.

The unhealthy town of Calcutta, in Bengal, has in its neighbourhood the healthy situations of Barasette and Ghyrettee; where the gentlemen residing in Calcutta should retire in the months of July, August, September and October. Both Chandernagore and Chinsurah, the French and Dutch Settlements in Bengal, are more healthy than Calcutta.—LIND.

It has been a subject of general remark amongst strangers that no place of resort for sick and convalescent has been established by the intelligent and quondam wealthy inhabitants of Calcutta; and considering the immensity of the capital lately circulating here, and the facility with which it was available for any enterprise, it is matter for just surprise that some such establishment has not been made.

The want of a place for the sick of Calcutta a matter of surprise.

On reviewing the whole of the proceedings—the formal “deed of grant”—with its whereas, a thousand times repeated—its committees and “trustees for themselves and their successors, to *have* and to *hold*, subject to the terms, provisions and conditions herein mentioned,” (no provisions against storms and inundations) one cannot but lament that so many sound legal forms, and so much of our good money should have been wasted on Saugor Island. Had the projectors of that scheme confined their views to the banishment of tigers, the growth of rice, and the making of salt, we could have nothing to object; but when Members of Council, Judges of the Supreme Court, Generals, Civil Servants, Divines, Lawyers, Physicians, Military

The Saugor Island scheme.

Officers and Merchants propose that “ farms and granaries, and towns and busy population shall succeed to all the frightful silence of sterility and pestilence ;” and moreover, when these gentlemen—the élite of an enlightened community—propose to lay out thirty thousand Rupees for a “ lodging house” on Saugor Island, and I do not know how much more, for baths, elephants, horses, palanquins, &c.—all for the advantages of the “ *sick who require sea air !*” *—it might have been expected that some step had first been taken to ascertain whether the place possessed in reality any capabilities for the residence, even of Europeans in health. I believe that such preliminary examination, on the part of a person qualified for the task, would have satisfied any one of the gentlemen above mentioned that Saugor never had, and never could have, any of the requisites aimed at, and that had the whole island been as well cleared of jungle as the glacis of Fort William, it had yet in its soil and in the adjoining localities, what must for ever have rendered it, a place of residence, fatal to all but Molunghees : altogether, the attempt would go to shew, that from the foundation of our city by Mr. Job Charnock, down to the Saugor scheme, no great advance had been made in medical topography. Yet the fault lay not with the gentlemen abovementioned, always excepting the “ physicians,” who ought to have known better : they were willing to bestow their capital, and their influence in promotion of what they knew to be an object of

* Calcutta Journal for 1819.

great public utility ; but all hope of ultimate success was vain, from the signal defect of every previous information requisite to give direction and effect to their endeavours. This Saugor scheme cost from first to last in human life, including all who died in the clearing operations, and the six thousand odd who perished in the inundation of 1833, more or less, seven thousand souls.

Lost in lives
and money in
the Saugor
scheme.

It cost in money—

Government preparations for a light house, ...	60,000
Expended by the Saugor Island Society,	3,29,000
Expended by the Lessees,	5,81,000

Total Sa. Rs. 9,70,000*

Any comment on the above summary would only destroy the impression :—all I hope is that we may be more successful in our next attempt.

From an extensive observation of the effects on health of a residence in the mountain ranges, I should be disposed to consider them as chiefly beneficial in *preserving* health, and in this sense they will always be found of the utmost importance to Military prophylaxis. When Europeans, on the other hand, have contracted actual disease, the neighbourhood of the sea, or an insular climate should be the great object ; and it is to these, above all others, that the inhabitants of Calcutta must look. To a person who has lost health in the marshes of Bengal, there are two considerations which give a preference to an

* Vide the interesting "Sketch" of Saugor Island, by Geo. Prinsep, Esq.

insular climate over every other ; viz. the purity of its atmosphere, and its equability of temperature, both of which are enjoyed by an insular position in a degree no where to be found. In Madeira the winter is 12° warmer than in Italy and France, while the summer is 5° cooler ; and while the mean annual range at Madeira is only 14° , it is double this at Pisa, Rome, Naples and Nice. I see numbers of officers proceeding to the Cape and to England every year, in whose cases a residence of two seasons in the hills has been insufficient to overcome the habit of recurrence even of common intermittent fever. From my experience, I should consider a two months' voyage to sea of greater efficacy in such cases, than two seasons passed in any of the hill ranges with which I am yet acquainted.

I have heard that there are situations along the coast about Balasore, that might be made serviceable as places of resort for sick during the south-west monsoon ; but as nothing precise is known regarding the localities, the matter must rest on mere conjecture.

Pooree and Amherst Island are better known, and, now that we have steamers, they, and perhaps some of the smaller islands on the Arracan Coast, deserve more consideration than has been bestowed on them.

Our ancient establishment of Negrais, however, would seem most eligible as a place of resort for the sick of Calcutta. We know it has one of the best harbours in India, and the loca-

lity could no doubt be improved so as to render it a desirable place of resort. Its insular climate, too—its free exposure to the unbroken influence of the south-west monsoon during eight months in the year, and its proximity to Calcutta—all point it out as a place highly worthy our notice.

The island is described by Sir Edward Owen to be of “great value as a place of commerce,” and the harbour from its “perfect shelter and smooth water” to be the best position for a naval station on the east side of the Bay of Bengal. Part of Negrais island he likewise describes as “an abrupt height, rising from a level plain, and which might be made almost impregnable.” Of the facilities afforded by the river of Bassein, the same authority speaks in the highest terms, as having water for the largest ships for 60 miles from its mouth, and for 40 miles beyond that, for vessels of 300 tons—“affording a direct communication to the heart of the kingdom of Ava, as well as the city itself.” The Admiral thus concludes his report: “I know of no great river with so few obstructions.”

ON THE SELECTION AND IMPROVEMENT OF LOCALITIES FOR THE EUROPEAN TROOPS.

“ There are instances, where the sick list in armies amounts to one-third of the total force, and others, where it does not exceed one-fiftieth, even one-hundredth part. The causes of such difference are sometimes visible and obvious. To discover their sources and to prevent their operations is important; and it frequently is a work of no great difficulty.”

DR. ROBERT JACKSON.

Injury to troops from being ill located.

It has been well observed by an able modern Surgeon, that “ where the hygiene of an army is judiciously regulated, the soldier may be kept in health and vigour; but allow an ignorant General to encamp on a marsh, let filth stagnate, fatigue excessively the men, crowd them in low damp rooms; and despite drugs, they will fall as unripe and blasted fruit, not by the sword but by the fever.”

All the stations below Benares unhealthy.

With reference to the purposes for which the European soldier is brought to India, and with reference also to the efficient exercise of his powers when called into action, it has always surprized me that so large a portion of this arm has been retained in the plains throughout the country, and at Stations such as Fort William, Dum Dum, Berhampore, Dinapore, &c. With urgent political reasons, or state necessities, I do not pretend to deal; but if these do not exist, I know of no defence that can be set up, either on the score of humanity, or of expense, in plea of the “ serious loss in the balance of national accounts,” consequent on the loss of men. “ The case is important, and the sovereign power will be false to its own interests, if it do not apply a

remedy when furnished with proof that are medly attainable, and particularly when informed that it is not difficult of attainment."

The number of lives lost from endemic causes at Fort William, Dum Dum, Berhampore and Dinapore during the five years ending 31st January 1834, has been as follows :

Deaths at the lower stations during 5 years.

Died and invalided, H. M.'s Army,	917
„ „ „ H. C.'s „	469
	1,386
Total	1,386

Looking at the above list, what a melancholy picture does it afford of the cost to humanity at which we have for the last fifty years derived protection from the European arm ; but if this arm be not really necessary to our protection, *where we have chosen to place it*, what a cruel neglect does it imply on the part of the State. "The ground-work of our power in India, says Major Sutherland, " is our substantial body of British soldiers." Believing this to be essentially true, I hope it may be thought " worthy the parental care of the State to examine the subject with attention, for the sake of ascertaining whether or not it be possible to unite defence and protection with such a disposition of the military force as is consistent with the preservation of health." The above quotations are from the celebrated work of Dr. Robert Jackson, on the formation, discipline and economy of armies, and especially that portion of it which he devotes to " a general view of service in tropical climates," wherein, though

The subject merits the consideration of Government.

he speaks with reference chiefly to the West Indian colonies, there is much that necessarily applies with justice to all tropical climates. Dr. Jackson's work ought to be in the hands of every officer, whether military or medical.

Dr. Robert Jackson on this subject in the West Indies.

It is positively true, he says, "proved to a demonstration in numerous instances, but proved by accident, not by avowed experiment—that European troops may be so stationed at the Islands of the West Indies as to retain their health nearly as well as they could be expected to retain it in their native country. The air of the interior and mountainous parts of the larger of the intertropical islands is comparatively cool and pleasant, and not unfriendly to the European constitution."

In another work by the same Author, is the following instructive example of the useful application of the labour of the soldier:—
 "Fort King George, island of Tobago, was at one time unhealthy; it is now, as appears by a comparative view of the sick returns of the army, one of the healthiest quarters in the Windward and Leeward island station. The means through which it was made so, as not of common application, deserve to be brought under public notice. The fact is strong, but it has not made useful impression upon the official authorities. Fort King George stood in 1803, under the lee of a swamp, at a distance of nearly one mile, and at an elevation of five hundred feet above the level of it. The exhalations which arose from the swamp, carried to the height by currents of strong

wind, were supposed to be injurious to the health of the garrison. The cause was obvious, and the effect was so destructive at one time that the commanding officer of the Royal Scots regiment which then formed the garrison, acting with the impulse of a soldier, determined to drain the swamp by the labour of the men rather than allow them to be destroyed in detail by its pernicious exhalations. He attempted it and succeeded. The fact is authentic, and it is important. It furnishes unequivocal proof that the European is not less capable of sustaining labour in tropical climates, even severe field labour, than the African ; and it is further of value as it shows that the most of what relates to the quarters and accommodations of the military may be effected by the military themselves without expense to the public. The planters lent the tools in the present case ; the soldiers of the Royals drained the bog ; they did it without reward, and without injury to their own health. Fort King George is now a healthy station ; and as rendered so by the Royals its future garrison may be supposed to bear an everlasting sense of gratitude to the memory of Lieutenant Colonel MacDonald, who conceived the feasibility of the undertaking from his own good sense, and executed it at his own responsibility. What he did was contrary to common medical opinion ; it was moreover done without the sanction of the chief military authority."

In Dr. Jackson's works there are many instances of similar results from the gratuitous

labour of the soldiers ; and, what is very important, this distinguished military physician always concludes, that the thing was done “ *with obvious effect upon health, morals and happiness, while the work was under execution.*”

The practical question may now be asked,—have we not in our Asiatic possessions any mountain tracts conveniently situated, wherein the European soldier might live in vigour through the advantages of a better climate, and the proper application of his own labour, and if so, why are they not made use of?

Healthy localities to be found in the East.

That such favorable localities abound, no one can doubt ; and I am disposed to think that the calling the attention of authority to them, for the important purposes stated, will prove one of the most valuable results arising from the plan of calling on Military Surgeons for notices of the Medical topography of the country generally.*

Importance of care in this matter.

Where European troops are now well located, as respects health, it has happened, just as in the West Indies—“by accident.” But it must not be supposed that it is only in the selection of sites for permanent camps and cantonments

* The plan here alluded to was suggested by the Author of these Notes in a report submitted to the Governor General in Council (Sir C. T. Metcalfe, Bart.) on the 26th March 1835, and which was finally adopted and ordered for the three presidencies of India on the 23rd November of the same year.

The matter is now in the hands of a large body of highly intelligent officers : the field is almost untouched before them ; and I, for one, do not doubt the result, or its great value, even within a few years to come.

that care is necessary : the occupation of a bad locality, if *but for one night*, may be productive of serious evil, as I witnessed, and suffered from in my own person, in Upper Ava.

The whole of this subject, as affecting troops, is of the highest importance : it was owing to the ignorance or neglect of *military* topography, that every ultimate object aimed at by Government in sending a force to Arracan, failed ; and it was a similar neglect of *medical* topography that caused the destruction of that force.



HABITS OF THE EUROPEAN SOLDIERY, AND THEIR
INFLUENCE ON HEALTH.

“An estimate of materials is primary to the erection of the military as well as other fabric; and as medical men are, or ought, from the nature of their studies, to be better acquainted with the materials of which armies are composed than men of other professions, the author is not disposed to admit the charge of encroachment, nor even to allow that he has exceeded the limit of his station in doing what he has done. He desires to be useful.”
—DR. ROBERT JACKSON *on the Formation, Discipline and Economy of Armies.*

Opinions of Sir
John Moore on
this head.

The same on
service in the
West Indies.

It was with a sagacity and penetration of the subject in all its latitude, belonging only to an officer of the highest order of talent, that Sir John Moore declared “a Roman army would have gone through their military exercises in the West Indies (he was then in one of the worst parts of it) and have been healthy.” The same distinguished authority adds, “the troops I observe, which have been most active, are the most healthy; a proof that the sun is not the cause of sickness. But in general the greater part of the sickness proceeds from want of interior discipline and economy in regiments.

“Great attention should be paid in this country to the cleanliness and even neatness of the soldier’s person, and the regularity of his diet in addition to the eating part of his ration instead of rum; sea or river bathing, constant activity and movement. In short, General, (excuse the pedantry of the expression), but with a Roman instead of a modern, exercise and discipline, the troops in the West Indies might I am convinced be kept healthy.

“A parade twice a-day, consisting merely of an inspection and exercise of arms is easy for officers; it leaves them what they call more time, but it leaves the soldier also to lounge the whole day in barracks, where the air cannot be good; and where from indolence his body becomes enervated and liable to disorder.” How much that is preventive of disease do these short sentences enjoin, and how applicable is the entire reasoning to the condition of the European soldier in this country.

His opinion applicable in this country.

Dr. Jackson, in his celebrated work already quoted, says, that, “planters, who may be said to work hard, experience good health comparatively; even soldiers are healthy when actively employed; they suffer when they remain immured in barracks in ease and apathy.” Again, “the writer ventures to say, by fair induction from fact, that if the soldier in the West Indies, instead of being restricted from labour, were permitted to do for himself whatever he is capable of doing, his health would suffer less than it now does, the mind would be occupied, there would be satisfaction and fewer of those causes of temptation, which in idleness lead him into error.”

Dr. Robert Jackson on the same subject.

The most complete army of modern times, in *health*, discipline and equipment, was that mustered by Napoleon in 1805, on the shores opposite to England, and which a distinguished British historian declares to have “acquired a degree of perfection, in point of discipline, organization, and military habits, unprecedented since the days of the Roman legions.”

Habits of the French army in 1805 under Napoleon.

It amounted to one hundred and fourteen thousand combatants ; and it is highly deserving of notice that its exemption from disease was ascribed by its incomparable leader to habitual light and cheerful occupation of body and mind, short of fatigue. “ Constant employment,” says one of his Generals, “ was the true secret both of their good health and docile habits ; neither officers nor soldiers were ever allowed to remain any time idle ; when not employed in military evolutions, they were constantly engaged either in raising or strengthening the field-works, or in levelling down eminences, draining marshes, or filling up hollows, to form agreeable esplanades in front of their habitations and where their exercises were performed.”

Marlborough's
discipline.

What the economy of Marlborough was, I do not know ; but there must have been something great in that discipline which, according to one who served under him, made his camp resemble “ a well governed city. Cursing and swearing were seldom heard among the officers ; a sot and a drunkard was the object of scorn ; and the poor soldiers, many of them the refuse and dregs of the nation, became, at the close of one or two campaigns, tractable, civil, sensible, and clean, and had an air and spirit above the vulgar.”

Abuse of spi-
rituous liquors.

On the abuse of spirituous liquors it were in vain to speak : before that terrible habit is overcome, something far more powerful than medical reasoning on facts or the warnings of experience founded on these facts, must be

brought into active operation : discipline must alter its direction : in place of being active only to punish wrong, it must, and ought to be exerted in the encouragement to good conduct.

The subject is one of the highest importance and interest, as affecting the character, efficiency, and entire discipline of the army ; it cannot therefore be too often urged on the notice of authority ; and I am sure I shall be excused for making a few brief quotations from the melancholy but emphatic report of the Deputy Inspector Marshall on this baneful habit of the European soldier in India. “ By the daily custom of imbibing spirituous potations, a new want is created, intemperance is established as a habit, and frequent intoxication is the consequence. The wretched drunkard must now have a large supply of liquor in the morning to recover him from the effects of the quantity drunk the preceding night. He perhaps has neither money nor credit, and his clothes are then sold at a small portion of their value. Some do not stop here ; for after having sold all their own clothes, they will rob their comrades and with the produce of their dishonesty provide the means of intoxication. Confinement follows upon confinement, court-martial upon court-martial, and punishment upon punishment, until the worn out wretch dies in hospital of the “horrors” (delirium tremens), fever or dysentery ; or if he should for a time resist the fatal effects of disease, his constitution becomes broken down by the combined influence of the poison

Deputy In-
specter Gene-
ral Marshall
on the same.

of spirits, an exhausting climate, and repeated attacks of illness, so that in a few years he is found unfit for further service in India, and is sent home to be invalided. Death is the last but perhaps not the worst result of intemperance. This description of the life of a British soldier in India is by no means highly coloured. But the evil does not fall on the heads of the unfortunate sufferers; military discipline in all its branches becomes deeply affected by habits of intemperance. To the generally prevailing vice of drinking are to be attributed almost every misdemeanor and crime committed by British soldiers in India. The catalogue of these, unhappily, is not a scanty one; for, by rapid steps first from petty, and then more serious neglects and inattentions, slovenliness at and absence from parades, follow disobedience of orders, riots and quarrels in barracks, absence from guards and other duties, affrays with natives, theft, and selling of their own and their comrades' necessaries—robberies, abusive language and violence to non-commissioned officers, and last of all desertion, mutiny, and murder, may be traced to this source. This frightful picture is not exaggerated. I have seen thirty-two punished men in a regimental hospital at one time, perhaps not a single individual of that number suffered for a crime which was not a direct or indirect consequence of the immoderate use of spirits.

I recollect attending to the punishment of seven men of the same Regiment who received among them 4,200 lashes. They had been all tried for crimes arising from habits of intemperance.

Since the institution of the Recorder's and Supreme Court of Madras, no less than thirty-four British soldiers have forfeited their lives for murders, and most of them were committed in their intoxicated moments."

How I may ask, can commanding officers and courts martial totally reject the excuse of intemperance so long as a soldier is furnished by Government with the means of depriving him of his reason as part of his daily subsistence, all of which he is directed to use.

Beccaria is of opinion that the punishment of a crime cannot be just (that is necessary) if the laws have not endeavoured to prevent that crime, by the best means which times and circumstances would allow. We instil the moral and physical poison with one hand, and hold out the lash with the other as the antidote against indulgence. Coercive measures are very ineffectual for preventing the evils arising from intemperate habits, partly because soldiers do not generally regard drunkenness an ignominious vice. Where punishment has no influence in checking a man from repeating a breach of discipline, or in preventing others from committing a like offence, it is worse than useless.

Where endemic fever prevails, the temperate, it is true, are attacked as well as the intemperate; but it is universally admitted by medical men that the former has a much better prospect of recovery than the latter. Desgenettes, in his medical history of the French army in Egypt, observes

Desgenettes,
on the French
army in Egypt.

that daily experience demonstrates that almost all the soldiers who indulge in intemperate habits, and that are attacked with fevers, die ; nay, we may go still further and say, that they have been more liable to an attack of disease.

Means of ameliorating the condition of the European soldier.

“ The obvious purport of these remarks is to recommend an abolition of the indiscriminate and uniform issue of spirit rations to European troops in India, with the view of abating the extent of crime, lessening the proportion of sick, reducing the ratio of mortality, diminishing the number of men discharged on account of disabilities, and of promoting the welfare, efficiency, and discipline of corps.”

The use of tobacco injurious.

There is another habit, however, on which I shall venture to say a few words, because it is a new one: I mean the immoderate use of tobacco—a habit I believe brought into fashion from the Continent, on the cessation of our war against the principles of the French revolution, and one which is considered by many, a manly habit, until the pale yellow face, shattered nerves and disturbed action of the heart, rotten teeth and gums, foul breath, &c. begin to shew themselves, and frequently it is too late to stop. All this and much more I have seen in innumerable cases, and I regret to say amongst a class of persons who have not the same excuse that is claimed by the poor soldier. I have also heard a great deal said on the good effects of tobacco-smoking in damp climates, and that by persons, who, in defiance of geographical distinctions, invariably carried the habit from the

marshes of Arracan to the arid plains of Dehli, and the mountain ranges of the Himalas ; but I think there is reason to question the good effects of this drug even in the fatherland of fog and damp, or that it ever acts as a preventive to any disease, and least of all to fever. Certain am I that it does not have this prophylactic effect in India, but quite the contrary. Damp and cold climates may confer a greater tolerance of, or immunity from the evil effects of the narcotic ; but these are perhaps all that can justly be admitted ; for the rest, it produces all and more evils than those stated, together with some of the worst forms of dyspepsia. Dr. A. T. Thomson, speaking of the tobacco medicinally used, says,—“ Its narcotic power, when it is employed in excess, weakens the digestive organs, obtunds the nervous sensibility and depresses the whole vital energy.” Of the empyreumatic oil of tobacco, which is produced in the ordinary process of smoking, the same author says that when introduced into a wound it “ causes instant death ;” and of the other active principle, the nicotina, that, upon the whole, it is evident that tobacco is a direct sedative whether employed in the form of infusion, or that of smoke ; and lastly, he declares that under all circumstances tobacco must be employed with the utmost caution. If such checks are necessarily put on the use of this drug in the hands of the physician, what need be added on the unlimited use of it in those of the heedless and ignorant soldier. Of hookah smoking, I need say little, as happily its day is nearly gone ; but I have witnessed many cases

of severe constitutional indisposition from its use, with perfect recovery on the discontinuance of the habit; the digestive function, that of the heart and the nerves, suffered alarmingly in some of the more inveterate smokers. Many persons flatter themselves that through long use such habits become a harmless second nature: they are a second nature, *for they have nothing to do with the first*, as was said of graver matters.

A medium in diet as in other things desirable.

It must not be supposed from these observations, that I am desirous of seeing the British soldier placed on a diet of vegetables, treacle and tea; far from it I would take nothing from him that constitutes a liberal and wholesome diet—not even the spirit ration, provided at the time of using it, he is a seasoned soldier and kept in full exercise: cooped up in barracks, as he is now, however, there can be no question that the spirit ration is highly injurious in every sense, and that it “constitutes a pernicious bounty” to the men. In diet, as in other things, extremes meet. Monsieur Jacquemont and the full-blooded British grenadier—each meets his death after his way; the man of extreme abstinence and the inordinate dram drinker, are here on a par. Monsieur Jacquemont prided himself on his abstinence and rigid adherence to a spare vegetable diet, through which he made certain to triumph over all tropical ills, while he should see his numerous English friends go before him with tumid livers and inflamed stomachs. He died, just as does the British soldier: without one other point of resemblance, moral or physical, here they met for once on a

Monsieur Jacquemont's abstemiousness too rigid.

footing of perfect equality; the Frenchman inane from defective nutriment, and the soldier collapsed after his deadly debauch; each rendered incapable of resisting the *external causes* of disease, falls a victim to endemic fever, and its sequel, organic lesion. There is nothing more necessary to the full powers of the soldier than a sufficiency of wholesome diet, with a due proportion of animal food; but here we should stop him, if we would preserve his moral and physical integrity: if we would preserve for him in India, the pre-eminent station, he has everywhere else maintained; if, in short, we would justify our boast, that the sun never sets on the British standard.

The British soldier in the opposite extreme.

A generous diet necessary to the soldier on active service.

It is very easy for England to keep the muster rolls of India full; but this will be useless, in a military sense, unless the habits of the men, and the climates in which they are placed, be carefully looked to. It was not by soldiers enfeebled by bad climates and worse habits that the hill of Albuhera was won.

ON THE TERM OF EFFICIENT SERVICE IN INDIA.

“Unie a la chaleur, l'humidite' de l'air debilité d'une maniere plus profonde et plus radicale encore, et dans ces pays malheureux, les personnes qui, par la force de leur constitution, ou par un regime tres attentif trouvent le moyen d'échapper aux principaux dangers qui les environnent n'entraînent pas moins habituellement une vie languissante et timide, qui glace toutes leurs facultes et les decourage dans tous leurs travaux.”

CABANIS.

Average term of years during which an European may retain mental and bodily vigour.

Since my entering on public service in India, I have endeavoured attentively to observe the moral as well as the physical effects of climate.—“The slow blight of the constitutional power”—in Europeans of long residence in it, but especially amongst those of the military classes; and the result, as far as I can judge from an ample field, is, that the term of twenty-five years is the very utmost that persons under ordinary health may, on the average, be expected to retain their British vigour of thought and action. Of the precocity spoken of by Drs. Moseley and Ainslie, I have never seen any evidence: they seem to have found in every other British youth within the tropics, a second Grotius:—*Reliqui viri tandem fuere*; GROTIUS *vir natus est*.

Precocity not a general feature. Cabanis speaks of but one form,—that of old age.

Cabanis, however, speaks of but one form of precocity in such countries—that of old age—(vieillesse precoce) and I fear, this latter is nearer the truth. On the other hand, if the age of 48 be the stage of highest intellectual power in Europe, this period would seem to be anticipated here:—after that, the decline of the mental and corporeal power is steadily progressive. “*We may stop when we are rising, but never when we are going downwards.*”

Certainly, all of my profession, and I think I may say of the services generally, who have attained to eminence in this country, have done so long *before* the twenty-five years, and few indeed have retained much of it for long *after*. One is delighted, however, by occasionally meeting in general society with exceptions to this melancholy rule; but how rare: you may perchance, see the veteran of 40 years service in all the mental freshness of youth, and beside him the officer of 25 years, superannuated and feeble in every respect; but the first is the exception; the last must ever be the rule that governs the mass.

Exceptions to the influence of climate very rare.

Thirwall, in his History of Greece, observes, that "the character of every people is more or less closely connected with that of its land,"—and we should take but a limited view of the effects of climate, and especially of localities abounding in marsh poison, if we considered only the more familiar effects of those agents on the European constitution, such as the various forms of fever, &c. The state of the air affects the mental energies, and moral feelings of many individuals, to a degree inconceivable to those who are not thus subject to its influence; and it should be recollected that even in Europe, the long continued application of such causes affects the mind to very idiocy, as commonly observed in some quarters of Tuscany and Switzerland.* Here also, how often do we perceive through the

The character of a people connected with the soil.

Extraordinary influence of soil and climate.

* The fever of the Tiracc and Arracan frequently leave the same moral and physical effects.

gradual operation of climate, that the fear of responsibility paralyzes the latter years of the once able civil functionary, doubt and hesitation those of the once vigorous soldier, and that, before either is overtaken by years.

The whole
subject of
great impor-
tance in India.

The causes, and their consequences, have not been sufficiently before authority ; but they demand the most serious consideration, so long as we may be expected to hold India through what, in European states, is called the power of opinion. There is no country in the world where so much depends on the *persons* of the functionaries and the spirit which animates them, as in India, and consequently, where the right selection of persons is of so much public importance.

ON THE MORTALITY AND PHYSICAL MANAGEMENT
OF EUROPEAN CHILDREN IN CALCUTTA.

The diseases of childhood run their course very mildly in Bengal, and upon the whole, it cannot be said that the climate of Calcutta is unfavourable to infant health up to five or six years of age, when the offspring of Europeans generally begin to shew the necessity for change of climate, by out-growing their strength. This portion of medical statistics, however, is quite as unsatisfactory as all that relates to the subject in India; but I believe the results of a close observation would afford corresponding facts to those obtained in France and England, viz. that the greater mortality exists under the extremes of temperature—the very colder, and the hotter months.

Calcutta on the whole not unfavourable to infant life.

Dr. Edwards' observations on the difference of constitution at different periods of life are of the highest importance as affecting children, and if generally understood and put in practice, they would, as he says, considerably reduce one of the most powerful sources of mortality. The power of generating heat is so feeble in the infant system, that it is impossible to be too guarded in the matter of clothing during our cold season in Bengal; for scarcely a year passes that I do not witness the most serious results from the exposure of infants, imperfectly clothed, to our piercing N. E. wind. Where the natural heat of the system is preserved by proper clothing, *and the diet of nature observed*, I do not think we have much to complain of in our climate, as it affects mere infant life.

Dr. Edwards on the difference of constitution at different periods of life.

Where, however, the opposite system is adopted, of *hardening*, by means of half-clothing, or the yet more unreasonable one, of *strengthening* by that of double diet, the results are even more speedily destructive than in Europe. They are brought about through the supervention of gastric fever, with occasional cerebral determination; diarrhœa, or the more slow process of mesenteric fever. Under ordinary care as to diet and clothing too, the operation of teething proceeds kindly in this climate.

Results of an inquiry at Narbonne.

At Narbonne, about the centre of France, on taking the proportion of deaths to births, the average for the winter quarter is one in 8.43 births, for the spring quarter one in 12.05, for the autumn quarter one in 10.60, and for the summer quarter one in 8.95.*

The extremes of season in Bengal the most unfavourable.

I believe the periods in which the greatest mortality occurs amongst children in Calcutta are, —in the cold season, December and January; April and May of the hot season. In the former, congestive and catarrhal fevers prevail, and in the latter remittent fever, occasionally of an ardent form, and diarrhœa. Altogether, the deaths are not numerous as compared to the births, and this is mainly owing to the rational plan of treating the children of the better classes, where generally the wet-nurses, the aliment, cleanliness, air and exercise, are well attended to.

On the subject of rearing children entirely in Bengal, I would only observe that the thing appears to be generally impracticable on the ground of experience.

* Dr. Robertson.

Mr. Twining says, that he has not been able, after much and careful inquiry, to find any where a sample of the third generation from unmixed European stock. I believe it is scarcely to be found in any part of India, least of all in lower Bengal;—so much for the question of European colonization, on which a great deal has been said and written here, without ever reflecting that nature had already set her ban upon it.

Experience against rearing children entirely in Bengal.

Dr. A. T. Thomson, in quoting Volney, the eloquent historian of Egypt, states the remarkable fact, “that neither the Mamlooks, who were a *Caucasian* race, nor the Turks, who are Mongolians, unless they married native women, which the Mamlooks never did, could continue their race in Egypt; all their offspring perishing in the first or second generation.”

Remarkable similarity of result in Egypt.

Without an accurate census of the Protestant population, tables such as these afford but slender information, whether for the purposes of the topographer or the actuary.

Burials in Calcutta of Protestant Christians.

<i>Years.</i>	<i>Adults.</i>	<i>Children under 5 years.</i>	<i>Total.</i>
1820	239	43	282
1821	196	50	246
1822	275	47	322
1823	215	55	270
1824	209	63	272
1825	240	54	294
1826	234	36	270
1827	190	45	235
1828	157	77	234
1829	128	32	160
1830	180	28	208

PUBLIC BATHS—WARM AND COLD BATHING.

So long as the Hindoos remain orthodox, and consider the water of the Hooghly, notwithstanding its indescribable impurities, not only pure, but holy—not only good to bathe in, but altogether excellent to drink, when not brackish, we need not trouble ourselves about public baths as respects the natives. We have only to take care of ourselves.

Necessity of discrimination in the choice of the bath.

It is very common to hear warm and cold bathing spoken of and recommended, without any reference to season or regularity of habits, although these should form essential conditions, as it appears to me, for guiding a choice between them. It may be concluded for certain, that to a person who has suffered much from tropical illness, or is affected with visceral enlargement, the result of fever, or dysentery especially—the warm bath is the only safe one, at *all seasons*.

The choice influenced by season and state of health.

To persons in ordinary Indian health, on the other hand, the cold will be found both tonic and agreeable, if used under regularity of habits, from the beginning of March to the end of September. I say, *regularity of habit*, because to the dissipated, or such as are in the practice of keeping late hours, the cold bath is always imminently unsafe; as with such persons, the balance of circulation is already unnaturally disturbed, and the effect of the cold is to throw its force on the organs chiefly irritated by irregular habits of life—the abdominal viscera. Under such unfavorable conditions, with the whole surface parched, and the digestive mucous

membranes in a state of irritation, it is not to be expected that the "conservative energies" should be capable of being "roused to successful resistance;" in other words, there will not be a healthy re-action; and I have known most formidable fevers produced by the incautious use of the cold bath, in young men of perfectly sound constitution, but of irregular habits, which would seem to reduce the power of producing heat in the system below the standard of health. Of the cold bath during the cold season, I shall only say, that to such as feel themselves sound in constitution, and whose habits of life are strictly regular, no more efficient means exists of obviating the most unpleasant effects of our cold drying season in Bengal: he who re-acts well under the cold bath, will not be troubled with dry skin and sense of internal fulness, &c. &c. Of the old baths in Armenian Street, I am not able to speak from personal knowledge, but warm, vapour, and cold baths, on an excellent and commodious plan, have recently been erected by Messrs. Spence and Wetherill, and which are highly deserving the support of the community.

The cold bath during the cold season unsafe except under the conditions stated.

APPENDIX No. 1.

It may appear to some persons that in what is stated at pages 122-3, I have over-rated the influence on public health of general knowledge and improved habits of life. I therefore quote the following observations by Tennant, made about 40 years ago, on the spot, with ample means of knowing the truth, and without any personal bias, or theory to support. They accord remarkably with those of Födere, when he says—"J'ai voyage, j'ai habité a dessein differens pays ; j'ai medite sur la condition des hommes dans les diverses circonstances de la vie ; j'ai vu qu'il etoit au pouvoir des gouvernmens de leur faire infiniment plus de bien que tous les livres de medicine ensemble."

“ MODE OF LIVING AMONG THE MILITARY AND CIVIL OFFICERS.

“ *Caampore, Jan. 1798.*

“ The mode of living in this part of India has, within the last ten or fifteen years, undergone a very great alteration. Before that period the civil and military servants of the Company of the first rank were lodged in bungalows worse than those of a subaltern of the present day : as the practice of feeding beef, mutton, pork, and poultry, was not then introduced, their tables were very poorly supplied ; even vegetables were not to be had ; though an article

indispensably necessary in this climate. These inconveniences were aggravated by a constant routine of irregularity. After dinner it was the usual custom to go to sleep, in the hottest time of the day; from this every party was awakened in the evening, to partake of a supper, which protracted a drunken sederunt till a late hour of the next morning.

“ Amidst continued repletion, and frequent irregularity, the climate operated with fatal influence; for trying as Bengal still is to almost every European constitution, there was a time when it was deemed far more hostile. A reformation highly commendable has been effected, partly from necessity; but *more* by the example of a late Governor General, whose elevated rank and noble birth gave him in a great measure the guidance of fashion. Regular hours and sobriety of conduct became as decidedly the test of a man of fashion, as they were formerly of irregularity. *Thousands owe their lives, and many more their health, to this change, which had neither been reckoned upon, nor even foreseen by those who introduced it.*

One species of dissipation often leads to others; the late hours and hard drinking induced gaming, which prevailed to a degree ruinous to many individuals: the same nobleman, above alluded to, by giving this practice his decided disapprobation, and promoting such as refrained from it, has in a great degree lessened the habit, by bringing it into disgrace. Much dissipation, however, still remains.”

APPENDIX No. 2.

What has been said at pages 160-69 on the influence of habits on the health of the soldiery, has equal reference to the condition of the European invalids all over India, who are now, too often, cooped up in mouldering fortresses, released from all discipline, and allowed to spend the remainder of their lives in a condition discreditable alike to the European character, and that of the Government.

In Bombay, these men are allowed to reside wherever they please, and the consequence is, that many of them become useful in agricultural pursuits, and in various trades.

Surely this is, on every account, the more desirable arrangement.

F I N I S.

